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THE JOURNAL OF THE NATIONAL DENTAL ASSOCIATION

1921

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Traumatic Occlusion—*Smith*
Preventive Dentistry—*Morton*
Radiographic Studies—*Hergert*
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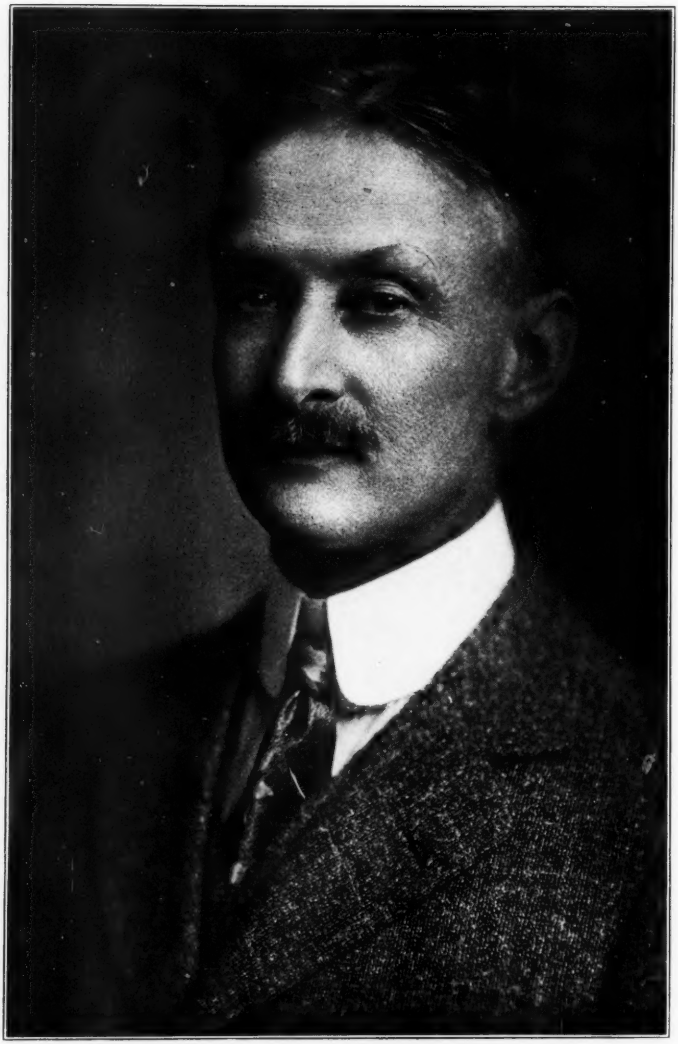

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President, National Dental Association

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Original Communications

A STANDARDIZED TECHNIC FOR GOLD PARTIALS

By F. EWING ROACH, D.D.S., Chicago, Illinois

(Read before the National Dental Association, Milwaukee, Wisconsin, August 15-19, 1921)

PARTIAL denture prosthesis has not developed as it should have during the past twenty-five or thirty years and surely no other part of our practice deserves more attention just at this time when extracting is so popular. And to my mind the thing most needed is standardization of technic. My attention in the use of the term "standardization" is to convey the idea that a definite procedure should be followed for each step in the production of any given class of partial denture. While each case will vary in detailed requirements the essentials of construction are fundamentally the same. Standardization is the "watch word" of all industrial and manufacturing enterprise. Why not ours? No line of human endeavor is more important. By standardization only can we hope to reach the highest degree of production in both quantity and quality. Standardization is absolutely necessary to the further development of this part of our practice.

The technic I am offering is the result of many years of concentrated effort and so far as possible has been standardized. The procedure is so simple, the time so short, and the results so uniformly satisfactory that the employment of all gold and porcelain is made possible in a very much larger percentage of cases than ever before. The advantages of the gold base over vulcanite or other materials employed for bases is so well known that discussion is unnecessary, and particularly is that true of the cast gold base.

We believe the cast gold base with loose pin porcelain crown to be the best form of construction and should be employed wherever possible. This type of appliance is almost ideal in every respect. The principal advantages are

that it permits of sectional construction, is stronger, less bulky, more easily and accurately fitted, more sanitary, more natural in appearance, with better lingual contour of teeth and easier of repair.

Sectional construction is especially advantageous in extension saddle and long-span cases where it is so essential to have the saddle in compressed relation to the alveolar ridge.

There is but little need today for the swaged saddle having the teeth attached with rubber. The cast saddle is more easily made and surely more accurately fitted, and while the casting as a general proposition is not so strong as the wrought metals, the fact that the pattern is fashioned in wax permits of reinforcement wherever necessary. This feature in addition to the employment of more rigid alloys makes possible adequate strength with no greater bulk.

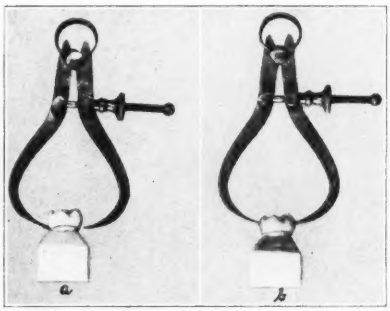


Fig. 1.—Buccal view of molar showing the difference in mesio-distal diameter at contact point and gingival surface emphasizing the necessity for some reduction of contour.

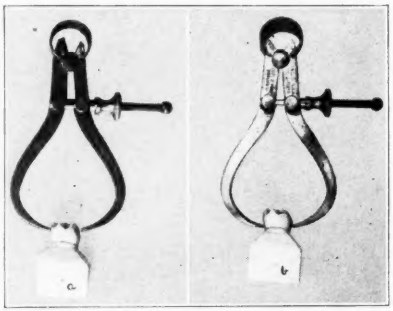


Fig. 2.—Mesial view of molar showing the greater diameter near the gingival surface, emphasizing the importance of carrying clasps well around the mesial and distal angles, thus securing reciprocal bearing, greater elasticity, and firmer grip.

Where gum restoration is necessary, protesyn is employed with most gratifying results. The essential features are: (1) sectional impressions; (2) sectional bites; (3) smooth hard casts; (4) waxing and casting direct to cast; (5) sectional or unit construction for the larger or multiple space cases; (6) for the smaller cases the clasps, saddles, floors and pins for dummies, cast in one piece; (7) one quality of gold for the entire structure; (8) very little solder; (9) a new porcelain crown tooth for this purpose; (10) low heat in dissipating wax; (11) horizontal, visible investment; (12) vertical, centrifugal casting.

1. *Preparation of teeth.*—Some preparation of teeth to be clasped is necessary. We must keep in mind that all alloys suitable for clasps are rather low in elastic limit and will not spring over extreme contours and return to a firm grasp on the tooth when in place, hence the necessity for the removal of excess contours. And by this do not understand that any considerable amount of enamel is removed at any one point. Never under any circumstances should the dentin be exposed (Figs. 1, 2).

2. *Impressions.* — Impressions are taken in sections for the sectional impression yields the most accurate results. Complaster is used for posterior and modeling compound for anterior impressions. By sectional impressions is meant the placing of material into the mouth in sections—not carrying the material into the mouth en masse and

breaking out in sections. By the former method we predetermine the line of separation so that impression is taken in two clean sharp well defined parts.

In view of the fact that practically all castings are made directly to the cast it is very essential that accurate impressions of the teeth be obtained at the time the impression is taken of the saddle areas. And this can be done by materials is the lessened danger of mutilating the cast when separating. Modeling compound is also a desirable material to use where compression of soft tissue is necessary (Figs. 3, 4, 5).

3. *Taking bite.*—In taking the bite more accurate results are obtained when small pieces of wax are fitted and the bite taken of each space as a separate unit.

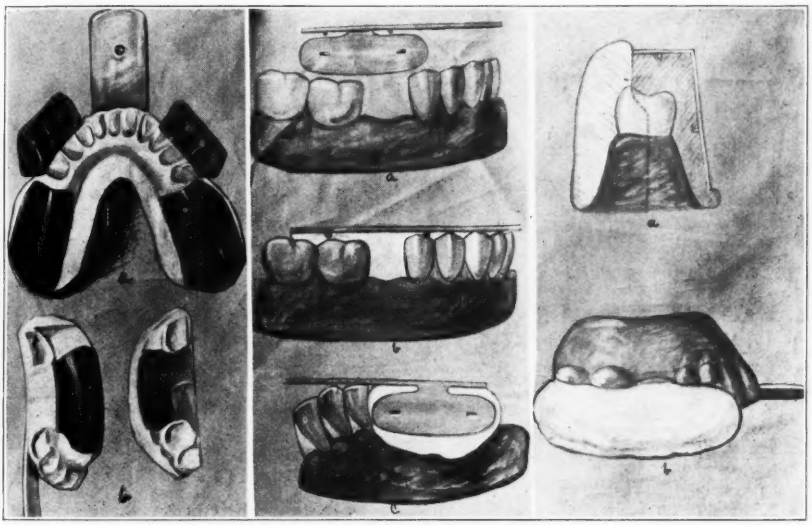


Fig. 3 Fig. 4 Fig. 5

Figs. 3-5—Fig. 3 *a*, sectional impression for lingual bar case using combination of plaster of Paris and compound to secure compression of tissue over which saddle is to rest. A good impression of saddle areas and lingual surfaces of teeth is taken in plaster, after which the saddle areas are relieved to the extent of about one-sixteenth of an inch and modeling compound traced on the surface with dry heat. The impression is replaced in the mouth and pressed down firmly until plaster part of impression shows accurate apposition to the teeth. Having completed this part of the impression a small bit of compound is used to get an impression of the buccal surfaces of teeth to be clasped. *b* shows a similar method for bridge case. Figs. 4 and 5 are sectional complaster impressions for short-span double clasp one-piece cast bridge. **Fig. 4** *a*, buccal view of teeth and space, and sectional tray; *b*, tray in position with buccal excess of complaster trimmed away; *c*, lingual view of same. **Fig. 5** *a*, mesial view of same showing predetermined line of separation as indicated by dotted line; *b*, completed impression with the two sections united.

the sectional plan only. Modeling compound or complaster are the materials preferred. These materials may be used in combination for some cases. The principal object in using these

4. *Casts.*—Casts are made of a hard smooth investment compound so that they will withstand mutilation and yield a smooth surface to the casting. Weinstein's Cast Clasp Investment was

designed especially for this purpose. Great care is required in making the cast to avoid air bubbles and other imperfections. Since we are casting directly upon the cast it is essential that it be hard enough to withstand mutilation during construction, and resistant enough to heat to stand the casting process. Great care should be taken to secure smooth-surfaced models. The smoothness of the casting is almost wholly dependent upon the smoothness of the cast; hence the importance of this feature. A very considerable experience and observation has convinced me that the Franzwa Investment Spatulator is the most efficient device yet produced for this purpose.

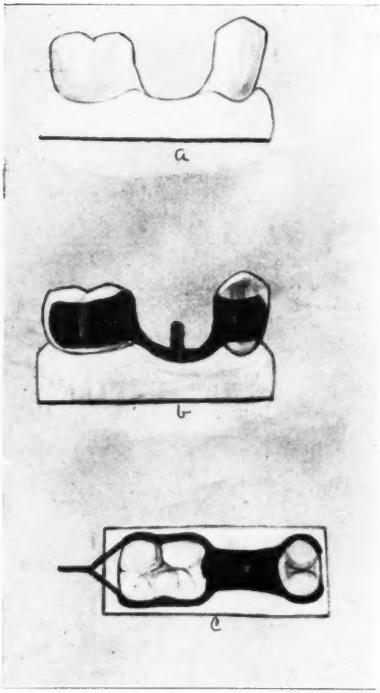


Fig. 6.—*a*, Cast; *b* and *c* buccal and occlusal views of case waxed up ready for investing.

5. *Waxing.*—Wax is melted to place on the cast and carved to the exact form of desired casting. Melting the wax in a ladle and carrying it to place with a suitable spatula has the advantages of being quick, free from danger of mutilation of cast and permits the essential variation in thickness. Preference is given to some translucent inlay wax. Cast should be comparatively dry so that the wax will adhere closely to surface; otherwise subsequent investment will run in between and cause a rough imperfect-fitting casting (Figs. 6, 7).

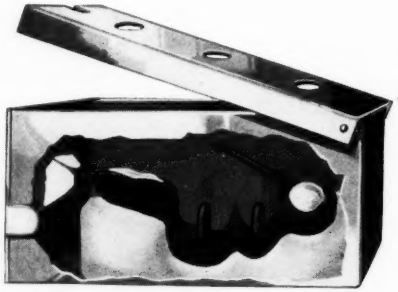


Fig. 7.—Side of flask cut out, showing case in position ready for pouring investment.

6. *Investing.* — The same careful procedure outlined for making casts will result in smooth surfaces of casting that is made against the flasking investment. The cast with wax pattern and wax sprue and air vent attached is placed in an open-side horizontal flask and the investment poured in around it.

7. *Dissipating wax.*—A high percentage of plaster content in the investment necessitates a slow low heat in dissipating the wax. The temperature should be kept between 350° and 400° F. for from one hour and a half to two hours. The size and number of cases placed in the oven will be cause for

variation in time. Maves's oven or some similar controllable heat oven is desirable for this purpose.

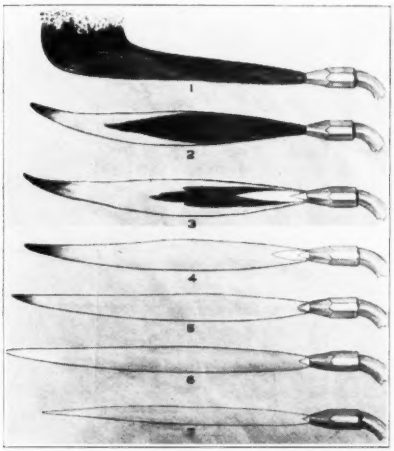


Fig. 8.—Chart showing seven variations in oxy-acetylene torch; No. 6 is the neutral flame which represents complete combustion and is the proper flame to use.

Fig. 9.—Vertical throw machine: *a*, flask; *b*, crucible; *c*, balance ball; *d*, propeller cord.

8. *Casting.*—The fundamental principles of casting inlays and prosthetic pieces are very much the same. There are nevertheless many points of difference and the routine procedure followed in most cases for inlays will not result in good prosthetic castings (Figs. 8, 9, 10). The principal points for consideration are the handling of the special alloys for clasps and saddles and the difficulties of casting these larger pieces.

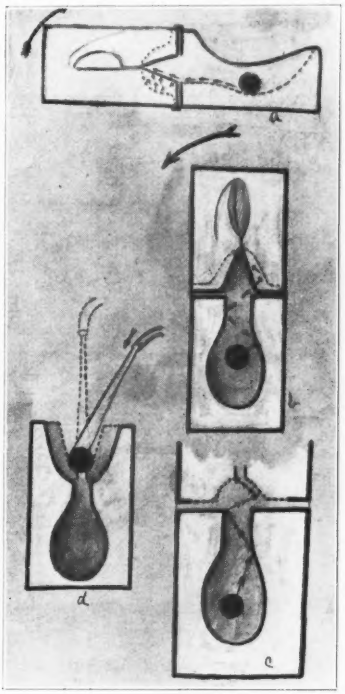


Fig. 10.—Diagrammatic drawings showing comparative effect of force on gold exerted in both vertical and horizontal throw casting machine: *a* shows crucible and flask of vertical throw machine (arrows in floor of crucible indicate uninterrupted path of gold into mold; dotted line in floor shows improper opening in flask); *b*, zigzag line of arrows shows course of gold in horizontal casting machine, flask and crucible on a straight line from center of rotation; *c* shows course the gold takes when flask and crucible are set at an angle of 45° from this line. Dotted line shows incorrect position of blowpipe and form of crucible where vertical flask is used in connection with other forms of casting machines.

In casting inlays where pure gold is used, there is not the danger of overheating, oxidizing, or carbonizing the metal as in the case of alloys, and when alloys are used for inlays the damage from these influences is not so vital as in prosthetic castings.

The requirements for greater strength and free flow of the metals used in making saddles, bars, and clasps call for a careful consideration of these features. The four common causes of damage to prosthetic castings are (1) the use of too hot a flame, (2) an oxidizing flame, (3) a carbonizing flame, (4) contamination with some base metal. Too hot a flame dissipates the lower fusing metals in the alloy, the oxidizing flame renders the metal sluggish in casting and brittle in results. The carbonizing flame while affecting the platinum-palladium alloys particularly on account of the affinity of these metals for carbon is also a dangerous flame for any alloy on account of the high temperature obtainable with this source of heat (the oxy-acetylene torch for example). Contamination with base metals, such as

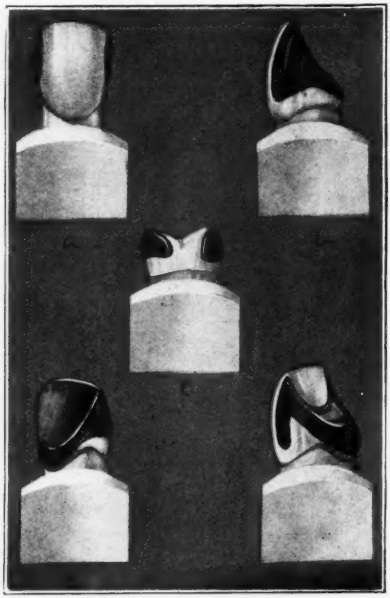


Fig. 11.—*a*, *b*, and *c*, three views of the mesio-distal grip clasp; *d*, modified form; *e*, distal view of bucco-lingual contour grip clasp on molar.

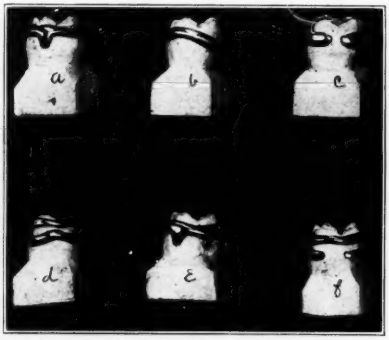


Fig. 12.—A variety of continuous ring clasps on molar. This is a light narrow clasp yet very strong, indicated in mouths where there is a marked susceptibility to decay.

Fig. 13.—Cuspid and molar special crowns showing long labial, buccal, and lingual ridge-lap and beveled base, also wax base ready to assemble with saddle and crown.

traces of iron that may be contained in the investment compound or the use of scrap gold the contents of which is not known, will also result in castings of an indifferent quality and in a high percentage of failures (Figs. 11, 12, 13).

Too much emphasis cannot be given to the importance of keeping up the standard of purity of the alloys that are to be used in this class of work. The excess and trimmings from each casting should have all adhering investment compound thoroly cleaned off with a stiff brush and either pickled in hydrofluoric acid or subjected to mechanical removal of borax. (The use of the centrifugal casting machine automatically does this refining at each casting.) (Figs. 14, 15, 16.)

Fig. 14

Fig. 15

In addition to precautions regarding the flame and refining, it is advisable to always add a portion of new alloy; for pieces requiring the full strength of metal, such as lingual and palatal bars and clasps, the use of fresh alloy of

standard known quality is advisable. For many of the saddles the requirements of strength are not so great; so that for these parts one need not be so particular.

Casting gold into any form, size, or thickness for dental purposes is a very simple thing when one has acquired a definite technic with an efficient equipment. If a given piece can be cast once it can be duplicated any number of times if each step in producing that one casting is duplicated exactly.

There are a great many sorts of casting devices in use and good castings can be made and with a reasonable degree of certainty with most of them, but careful study and experimentation has proved the vertical throw centrifugal type of machine to be the most dependable.

The essential advantages of centrifugal machines are: (1) gold is melted in a crucible, some distance away from flask; (2) a larger sprue may be used which permits free passage of gold into mold; (3) there is no danger of the sprue hole being stopped up with a bit of gold that has been dropped in advance of the attempt to cast.

Some very desirable features to be found in a casting machine are as follows: (1) vertical throw; (2) tight joint between crucible and flask as a precaution against spilling gold; (3) continuous surface for run of gold; (4) propelled by pulley cord which gives a quick, smooth get away and an accumulating speed with a constant sustained pressure until gold congeals; (5) no noisy gear or spring to get out of order; (6) practically automatic balance; (7) double locking device with automatic release; (8) variety of flasks suited to inlays, clasps, and saddles of any size; (9) automatic refining of gold every time a casting is made; (10) concentration and uninterrupted passage of gold into mold; (11) the employment

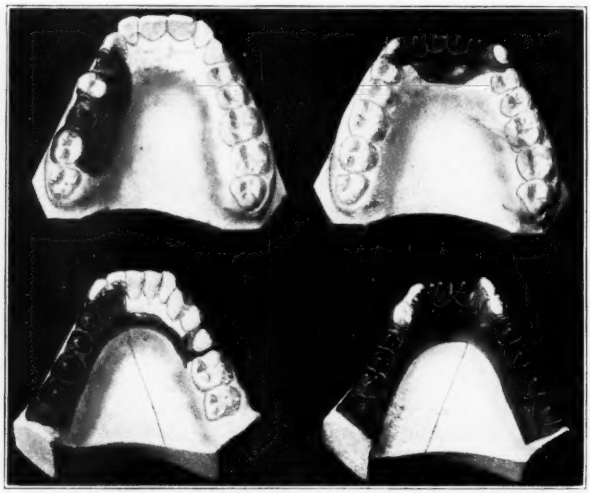


Fig. 16

Figs. 14-16—Casts waxed up ready for investing; lines show where casts are cut in sections preparatory to casting.

of air vents; (12) flask that permits of visible horizontal investment, using wax sprue, stiff mix, double investment and air bubble control.

The following is an explanation of the terms used in making tests:

Cold mold—room temperature.

Warm mold—approximately 350° F.

Annealing—subsequent heating of the casting to dull red, 1300° F.

Slow cooling—either in air or in flask, room temperature.

Quenching—immersed in water either in or out of flask, after sufficient time has elapsed for metal to turn dark. Quenching should never be done while metal is at red heat.

Elastic limit is determined by high point to which metal will stretch and come back to its original condition or shape. Indicates breaking down to some extent of crystalline formation.

Tensile strength represents the ultimate strength under pulling stress.

Ratio of ductility is computed by amount in pounds per square inch of stress the metal will stand after passing the elastic limit, to the ultimate breaking-point.

Reduction of area—reduction in the diameter of the bar tested at the breaking-point.

Elongation—the amount of elongation that takes place under pulling stress up to and including breaking-point.

After making a series of about fifty castings, which were cast into warm and cold molds, cooled slowly and quenched, and another series which were subsequently heat treated, some being cooled slowly and some quenched, the bars were taken to the Armour Institute of Technology where physical tests for elastic limit, tensile strength, ratio of ductility, reduction of area and elongation were made.

After studying the Armour report showing the physical properties of cast gold bars tested, a chart (Fig. 17) was made for purposes of comparison, which has enabled us to draw the following definite conclusions:

Group 1: Casting into cold mold with slow cooling in or out of flask causes metal to become too hard, to a point that might be termed brittle. Casting into cold mold, then annealed and cooled slowly provides practically the same physical condition as casting and cooling.

Group 2: Casting into cold mold and quenching in flask almost immediately (viz. after thirty seconds has elapsed) increases ductility to a desirable degree for clasps, bars, etc.

Group 3: Casting into warm mold, annealing and cooling slowly provides a more desirable physical condition than casting into a cold mold with slow cooling. Tests show it to be slightly more ductile but not sufficient to be considered the most desirable.

Group 4: Casting into warm mold, then annealed and quenched, softens the metal a little in excess of the amount required. It provides a slightly greater degree of ductility than is indicated for cast clasp work.

Group 5: Casting into warm mold and quenched provides a very desirable physical condition and safeguards the technician against undue brittleness. It produces a tough, strong and elastic casting, with just enough ductility to prevent breakage.

Group 6: Casting into warm mold and cooled slowly provides a slightly harder metal with less ductility than warm mold quenched and while this method produces an ideal physical condition for some cases where the nature of the work reduces the danger of breakage, we believe it is not as desirable for all purposes as the casting made into a warm mold and quenched.

The quality and smoothness of sur-

face of casting are dependent upon the casting temperature. The temperature of the metal at the time of casting must neither be too high nor too low. When the metal is at white heat and sputtering, it is too hot. It is important however, that care be exercised not to attempt casting until the entire mass is in a molten or liquid condition. This determination can be made by watching the metal at the time the scum breaks, displaying a clear and mirror-like surface. It is easy to determine whether the mass is all molten or not by whipping the blowpipe flame on the mass.

In conclusion I wish to thank Mr. Thomas G. McMahon of the Dee Company, and Mr. Huntly of the Armour Institute for valuable assistance in making the tensile strength tests.

Designated	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
	Cast into cold mold, annealed and cooled slowly	Cast into cold mold, annealed and quenched	Cast into warm mold, annealed and cooled slowly	Cast into warm mold, annealed and quenched	Cast into warm mold and quenched	Cast into warm mold and cooled slowly
	Group Average	Group Average	Group Average	Group Average	Group Average	Group Average
Elastic limit Pounds per square inch	84,750	55,600	84,700	57,750	60,125	75,525
Tensile strength Pounds per square inch	87,600	67,850	90,650	69,200	72,750	86,275
Ratio of difference between elastic limit and tensile strength as it compares to tensile strength						
Difference, Pounds per square inch	2,850	12,250	5,950	11,450	12,625	10,750
Percentage	3.2	18.04	6.6	16.5	17.3	12.4
Percentage of reduction of area	5.3	23.4	2.6	22.7	18.4	5.7
Percentage of elongation in two inches	2.5	15.2	1.5	15.5	11.1	2.0

Fig. 17—Chart of tensile tests made by the Armour Institute.

TRAUMATIC OCCLUSION AND ITS CORRECTION IN THE TREATMENT OF PYORRHEA ALVEOLARIS

By TOM SMITH, D.D.S., Langdon, North Dakota

(Read before the National Dental Association, Milwaukee, Wisconsin, August 15-19, 1921)

TRAUMATIC occlusion has been well defined as "a perversion of the occlusal relations of the teeth when in use, whereby excessive stress is brought upon one or more antagonizing teeth" (15). Whether this condition is one of the causative or resultant factors of pyorrhea alveolaris is a much disputed question. It is my opinion that in some cases it may be a cause, while in other cases it may be a result of pyorrhea. However, to those operators who devote much of their attention to the treatment of pyorrhea, it is an evident fact that occlusal trauma is always present.

In the correction of traumatic occlusion much has been accomplished by a few skilful operators. In their procedure clinical evidence and carbon paper are used in locating the high spots which limit the range of occlusion. These high spots are reduced or ground down by the use of carborundum stones (10, 16). However, this condition of traumatic occlusion is most frequently overlooked. If not passed by unnoticed, it is generally treated for correction by such careless and promiscuous grinding of tooth cusps that if it is partially corrected in one location it is aggravated in another. Many occlusions are ruined in this way. Others are made thoroly uncomfortable for the patient, because of inability to find a condition of occlusal rest. One patient, after having received such treatment, aptly remarked: "My teeth can find no comfortable place in which to sit down"—a remark very expressive of what many other patients have experienced.

CAUSES

Any condition which contributes to the loss of function will undoubtedly result in traumatic occlusion, for it is a fact, as George S. Monson (13) has stated, that "food and function equal force and form." Following John Oppie McCall's chart (11) we find the more common factors of cause to be: first, malocclusion as expressed by mesio-distal malposition, labio-lingual malposition, drifting as a result of extraction (4), approximal wear and inharmonious occlusal wear; second, restorative defects as expressed in defective occlusal surfaces, defective lingual, buccal or labial surfaces, prosthetic attachments (5); third, abnormal tooth form (congenital) as the shape of occluding cusps and number and position of cusps; fourth, habits of occlusion.

EVIDENCE

There are three main sources of evidence in traumatic occlusion, clinical, radiographic and casts properly mounted upon an instrument which will accurately reproduce all of the movements of mastication. It is evident that of these three sources the last mentioned must be final, altho it would be folly to neglect any step in the other two.

Clinically, the following symptoms may be observed: loss or impairment

of function, gingivitis, calcarious deposits when not definitely traceable to other causes, fine dark red lines on the gum tissue parallel to the root, especially noticeable on the lower labial gum tissue. These are among the earlier signs. When the pathology has become more advanced there will be evidence of excessive mobility of the tooth in its socket. This may be detected by placing the index finger on the buccal or labial surface of the suspected tooth and directing the patient to close the jaws and reproduce the masticatory movements (1). Pocket formation in the alveolus and tenderness of the tooth to percussion are also apparent in the advanced stage. One of the most common methods of detecting traumatic occlusion and locating the high spots is by the use of carbon paper between the teeth. However, this is not always an accurate procedure, as will be shown later.

In directing attention to the loss or impairment of function in connection with traumatic occlusion, one instinctively thinks of the masticating function, with its attendant train of disorders. It is seldom that loss or impairment of function in the act of swallowing is considered in connection with traumatic occlusion. It is well to keep in mind some of the following points. The normal act of habitual swallowing is performed several hundred times daily. Each performance requires about six seconds from inception to completion (7). Considerable positive force is applied in occluding the teeth in the normal act of swallowing. The function cannot be properly accomplished unless the teeth are in full occlusion. There is also a negative or sucking pressure produced. Under interference, this negative pressure will diminish almost to the vanishing point and the patient will have to be taught how to swallow properly again. Any abnormal condition, such as a tender or aching tooth, which interferes with either this positive or negative pressure will interfere with the function of swallowing. The loss or impairment of the function of swallowing will, most assuredly, result in traumatic occlusion and an atrophying of the muscles which enter into the function of the mandible. Monson (14) points out that the act of swallowing should drain all parts of the mouth and the Eustachian tubes. This is accomplished by the negative pressure, the tongue being in contact with the gums on the lingual and the cheeks and lips being in contact with the gums on the buccal and labial. We find the cheeks and lips working in such a manner as to squeeze or force the contents of the vestibule or buccal and labial cavities thru the interproximal spaces. In fact it would appear that one of the most important results of this habitual swallowing is to keep the mouth clean by the negative pressure sucking out and draining the decomposing and fermenting food particles and saliva from the interproximal and subgingival spaces and also forcing foreign material from the surfaces of the soft tissues. When this function is interfered with it is readily understood how conducive the condition would be to the increase of calcarious deposits and to the assistance in the development of caries, gingivitis, and traumatic occlusion.

This loss or impairment in the act of swallowing also contributes to a marked dimunition of tone of the peridental membrane. As has been noted, a considerable force is exerted in the normal act of swallowing. As the teeth are occluded they are pressed down into their sockets. This act compresses the peridental membrane and the blood is forced out of its small vessels thru the walls of the alveolus. As the pressure in swallowing is released the pressure on the teeth is released and automatically the pressure on the membrane and small blood vessels. An inrush of new blood then takes place. This physiological action, occuring several hundred times daily, contributes greatly to the health of the peridental membrane and its associated structures,

the free flow of blood preventing stasis, or congestion in the capillary circulation (6).

A careful study of the radiographs of cases of traumatic occlusion leads to the opinion that the pathological changes of the supporting tissues or periodontium are markedly different in the various classes of force application. This is in harmony with the statement of Paul R. Stillman (15): "Occlusal trauma is manifested in three ways as regards the application of force to the tooth; first, thru elongation, whereby a tooth extends out of its socket; second, thru tipping, whereby force is applied at an abnormal angle to the long axis of the tooth; third, the wedging of one inclined plane in gliding past another, whereby a tooth is forced to one side of its socket." In the first class the radiograph generally reveals a thickening of the peridental membrane in all of its area. In the second class there is a distinct absorption of the alveolar process on the opposite side of the tooth from which the force is applied, forming a definite pocket between the alveolus and the root. In the third class a thickening of the membrane is usually noted; but the characteristic pathology of the alveolar process in this class is the rarefying of a narrow wedge-shaped area between the root of the affected tooth and the root of the approximating tooth. The base of this acute wedge-shaped area is between the apices of these approximating roots, while its vertex points toward the gingival crest. In the more advanced stages of all three classes there will be an absorption of the alveolar crest and usually a deep-seated rarefying osteitis (12, 16).

It is well to remember that the sockets of the teeth are lined with a plate of very dense bone which appears on the radiographic film as a fine white line. This dense lining, in some cases of well-dried jaws, may be removed as thin flakes from the sockets and in a few instances it may be removed intact in its complete circumference. It is named by various authors as the linea dura the peridental lamella and the lamina dura. The latter term is preferable for, as McCall points out in a personal letter, "it states an anatomical fact which is that the bone lining the socket is a layer or lamina of dense bone. It is not a line nor is it a lamella of the peridental membrane." Between this lamina dura and the root the radiograph usually shows a narrow dark line which represents the peridental membrane. Particular attention is directed to these two radiographic findings. The fact has been emphasized by Robert H. Ivy (9) that these lines are important landmarks in the interpretation of radiographic films, as their absence or deviation usually means some pathological condition. An increased thickening of this socket lining or lamina dura is especially noticeable when the force of the traumatic occlusion is directed in a line with the long axis of the tooth. It would appear to be a condensing osteitis produced by nature to resist the additional occlusal stress (3). In this same class of cases where the radiograph shows an increased condensation of the alveolar wall on the inner side of the socket there is also an increased thickening of the peridental membrane. This condition opens a larger path for the ingress of organisms to the underlying tissues. Hartzell and Henrici (8) have well described this dental path as an avenue to infection. In the radiographic diagnosis of occlusal trauma these lines are of prime significance, for it is in them that we first find evidence of injury to the tissues. Much of the above-mentioned diagnostic evidence lacks confirmation and cannot be verified in the mouth.

Hilan D. Aldrich (2) draws attention to the following facts: It is impossible to view all of the surfaces of all of the teeth when in their various positions of occlusion. If any attempt be made to use carbon paper in the mouth the patient will frequently defeat the purpose by avoiding contact with the sore

tooth or teeth, which is the evidence of traumatic occlusion, due to the high spots. This avoidance of occlusion of tender teeth is usually not intentional on the part of the patient but the result of habitual muscular development causing limited movement of the mandible. Many times, altho the tooth may be sore, the patient, when requested to do so, will bite directly upon it. The repeated occlusal stress has made it loose and it will cushion down into its socket. The adjacent teeth, being firm, will leave more definite markings on the carbon paper than the real offender.

IMPRESSIONS AND CASTS

It is not my desire to belittle the clinical or radiographic aspects of the diagnosis but to draw attention to their incompleteness and to suggest as a more thoro and scientific measure the recourse to casts of the natural dentition mounted upon an articulator. This instrument must permit the mounting of the casts of the natural teeth in their actual relationship as found in the mouth. It must correctly reproduce all of the movements of mastication. The instrument illustrated is the only one known which will accurately fill all of the above-mentioned requirements. With the casts properly mounted upon the instrument we are in a position to visualize all of the teeth. Inasmuch as the plaster teeth are rigid, as is also the instrument, all points obstructing the range of occlusion are readily observed and removed.

In taking impressions different materials may be used. If there are no loose teeth a half-and-half combination of S. S. White Black Tray Compound and Kerr's Perfection Compound is good. This should be heated to 150° F. and thoroly mixed. Apply to a stiff shallow tray. Hold over the flame and coat quickly with a thin vaseline and secure the impression. It is not necessary to take an impression of more than the cusps and one-half the length of the natural crowns. Chill the impression with cotton rolls or folded napkins dipped in ice water, while in the mouth. There should be no drawing in the removal of the impression. If any of the teeth have lost their fixation and a mobility is apparent, a thin rapid setting plaster is preferable, as these teeth should not be subjected to any occlusal pressure in securing the impression. It is most essential that the casts should represent the positions of the teeth as they are held in the arch when the mouth is open.

Very hard setting plaster is used in pouring up the casts. In some cases the operator may wish to use a low fusing metal. If so, the impression should be secured in plaster. In some instances, I have packed the individual tooth impressions with a good amalgam and poured the balance of the cast with plaster. The main advantage of this method is to secure casts less susceptible to abrasion.

MOUNTING CASTS

Figure 1 A is a side view of the transfer bow, plate, and bite as applied to the patient. It will be noted that the end of the face bow is directly over the head of the condyle, which is located one-half inch anterior to the distal border of the tragus. Figure 1 B illustrates these same points from a front view. Figure 2 shows the transfer bow, plate and bite as applied to the lower cast properly mounted upon the instrument. This illustrates the method of transferring dimensions from the fact to the instrument, maintaining the relations of the occlusion to the condyle and the center of applied force; an outside triangle is used to locate the inside (Bonwill) triangle. After removing the transfer bow, plate and bite from the lower cast, the upper cast is occluded to the lower and then attached to the upper plate, which is already secured to the upper cast carrying arm (Fig. 3). Note the elongated condition of the upper right third molar and the prominence of its large lingual cusp. Figure 4 gives a left view of these

same casts in centric occlusion. The mutilation and deformity caused by the extraction of the lower left first molar is very apparent. Note the manner in which the lower left second molar is being tipped forward by the super-stress of the occlusion from the upper second molar. Also that the lower second molar is tipping the upper first molar forward. These are very common conditions.

A B

Fig. 1.—A, side view of the transfer bow, plate and bite as applied to the patient; B, front view.

CORRECTING TRAUMATIC OCCLUSION

As above stated, all points obstructing the range of occlusion are readily observed and removed but they should be corrected with much care. The anterior occlusion should be treated first. This is accomplished by first releasing the set screw which controls the anterior movement of the instrument. The high point of obstruction, or cusp, which is most apparent in limiting the anterior occlusion, is first cut down on the plaster cast, and then with a stone the same correction is made in the mouth. This is continued until the anterior occlusion has been corrected as much as is possible on this set of casts without correcting the same point twice. The set screws which control the lateral movement are now released and the correction for lateral occlusion is made in the same manner. It will be observed that if the anterior occlusion has been properly corrected very little interference to lateral co-ordination will be encountered. As has just been stated, several points may be corrected upon the same set of casts but the same point should never be corrected more than once upon the same cast. As a rule it is necessary to make corrections upon two or three sets of casts before the occlusion has been properly restored and the teeth reduced to a state of occlusal co-ordination. Caution must be exercised in every detail of the operation. Several days should elapse before impressions are secured for each succeeding set of casts so that the teeth may have time to right themselves into their new positions, as lateral stress may not have been wholly removed and further correction may be necessary.

In practice it is well to coat the occlusal surfaces of the casts with a varnish made by dissolving celluloid with ace-

tone and colored with fuchsin. This allows one to keep a very close check upon the corrections made on the plaster teeth for as each cut is made a definite white spot appears. For photographic effects the casts illustrated were left uncolored, each correction being marked with India ink.

CASE ILLUSTRATED

All of the illustrations are of the same case. This particular case was not selected because it was extreme in any particular. In fact it is quite the contrary, and its selection for illustration in this paper was largely due to the fact that I wished to show what a marked improvement could be made in a very ordinary case, and also for the reason that this patient had been treated, in a most careful and thoro manner, for pyorrhea several months previously. Since that time the mouth has been given excellent personal care but several of the teeth were still surrounded by inflamed tissues and the conditions were not what would have been ordinarily hoped for. It was decided to keep the case under observation for a few months and then to correct the traumatic occlusion and note the improvement. Two members of the North Dakota State Dental Association were present when the correction was begun and they know the conditions. After the corrections were completed the patient accompanied me to St. Paul, where he appeared before several members of the Monson Clinic Club for examination. Furthermore, all of the casts in the case were examined at that time. The patient was very much relieved and pleased with his mouth conditions after having received the pyorrhea treatment. He is now delighted with his improved masticating ability and the comfort of his occlusion. The case had one slight difficulty, owing to the fact that it was not thought advisable to interfere with the small lower anterior bridge which was in place.

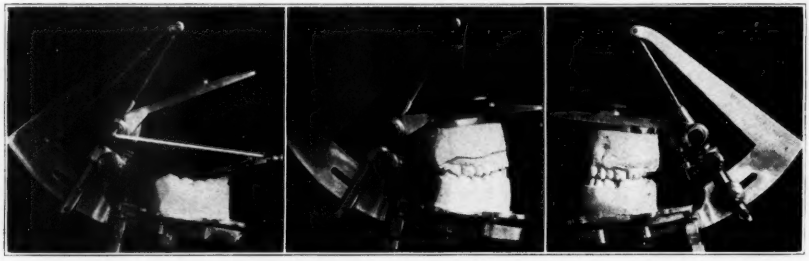


Fig. 2 Fig. 3 Fig. 4

Figs. 2-4.—Fig. 2, transfer bow, plate and bite as applied to lower cast properly mounted upon the instrument; Fig. 3, upper cast occluded to the lower, after removal of transfer bow, plate, and bite from the lower cast; Fig. 4, left view of same casts in center occlusion.

It is not to be expected that all cases of occlusal trauma can be corrected by grinding. In cases where the occlusal wear has been very manifest, or if for any reason the normal facial dimensions have been lost, so that there is evidence of encroachment of the condyles upon the auditory meatus, the occlusion will then have to be built up rather than reduced. Neither is it to be expected that these cases may be dismissed when the occlusion has been corrected. Definite reconstruction work will have to be instituted and the conditions which allowed the teeth to lose their normal occlusal relations corrected. In doing this, care must be exercised

not to re-establish conditions which will tend toward a recurrence of traumatic occlusion.

Figure 5 illustrates the occlusal surfaces of the first set of correction casts. The black spots upon the occlusal surfaces indicate the points of obstruction which have been cut down. The more extreme of these points were the large lingual cusp of the upper right third molar and the distal half of the occluding surface of the lower left second molar. Figure 6 indicates the corrections made upon the second set of casts. It may be advisable, after a short time, to make further slight corrections in this case.

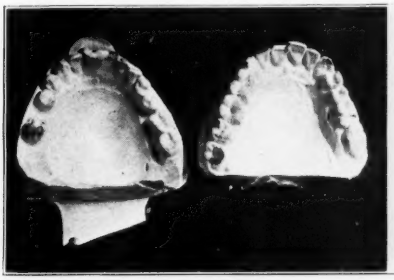


Fig. 5

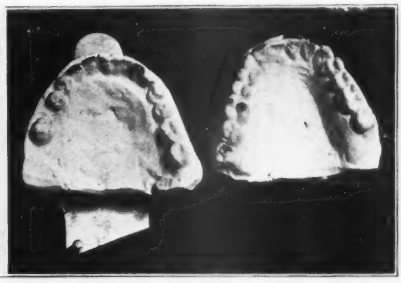
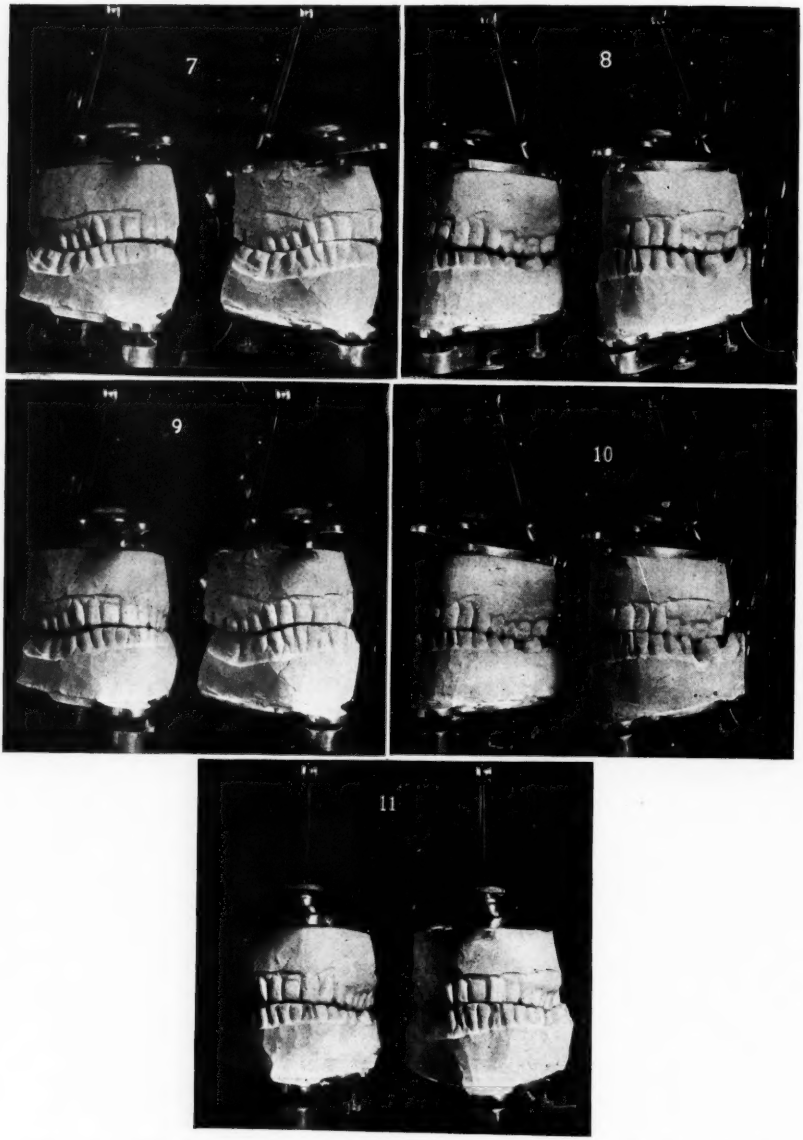


Fig. 6

Figs. 5, 6.—Fig. 5, occlusal surfaces of first set of correction casts, the black spots upon the occlusal surfaces indicating points of obstruction which have been cut down; Fig. 6, corrections made upon second set of casts.

In Figures 7 to 11 the mounted casts upon the left side are of the same set which was shown in Figures 3 and 4 and is a record set secured before any corrections were made. The casts upon the right instrument were made after the second and final corrections were completed. Figure 7 is a right view of the right lateral occlusion before and after correction. In the uncorrected casts (at the left) the only point of occlusion is where the large lingual cusp of the upper right third molar occludes with the disto-lingual cusp of the lower right second molar. Figure 8 is a left view of the right lateral occlusion before and after correction. The occlusion is exactly the same as in the preceding figure but viewed from the opposite side. Note the difference before and after correction. In Figure 9 we have a right view of the left lateral occlusion before and after correction. In the uncorrected case there are no teeth occluding on the right side nor on the anterior. Figure 10 is the same as Figure 9 but observed from the left side. Altho the illustration appears to show considerable occlusion in the uncorrected case there are really only two points of occlusion and they are the mesio-buccal cusp of the upper left second molar with the disto-buccal cusp of the lower left second molar and the buccal cusp of the upper first bicuspid with the buccal cusp of the lower first bicuspid. Figure 11 is a front view of the anterior occlusion, before and after correction. In the uncorrected casts, in this position, there is but one point of occlusion and that is the large lingual cusp of the upper right second molar with the disto-lingual cusp of the lower right second molar.

The prevalence of occlusal trauma is much greater than is generally supposed. Nor is it limited to its association with periodontoclasia, as it may obtain for some time before destructive evidence



Figs. 7-11.—Fig. 7, right view of right lateral occlusion before and after correction; Fig. 8, left view of same; Fig. 9, right view of left lateral occlusion before and after correction; Fig. 10, same, observed from left side; Fig. 11, front view of anterior occlusion before and after correction.

is apparent. The manifestations of the pathology of this condition become more apparent with time. Its very nature prevents a recurrence to normal without correction. This has been well described in a personal letter received from Clyde M. Gearhart, in which he says: "Like the proverbial snowball rolled down the hill, the more it rolls the bigger it becomes, and once a tooth is permitted to migrate, rotate, elongate, or in any manner lose its normal relations with its opposing mate, the trouble becomes more manifest day by day." It makes no difference how skilful the periodontist may be, nor how carefully he may follow every detail of the operation; if the tooth, or teeth, in traumatic occlusion cannot be brought to a proper state of physiological rest, inflammation of the soft tissues and destruction of the underlying process will continue, and no cure can be effected.

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Discussion

F. A. Bricker, Rochester, Minnesota: I do not think that a sufficient amount of thought is given to the pressure exerted on teeth during the act of swallowing. I invariably instruct my patients after cleansing their teeth at night to swallow if possible three times. That gives a certain amount of suction to the mouth and stimulates the soft tissue. There is no doubt that this one act gives the teeth more exercise than many people give them during the day or during the act of mastication.

Dr. Smith has shown very clearly by his mounted models that a case may have normal occlusion in central occlusion but have abnormal occlusion on anterior or lateral range of occlusion and it is this abnormal lateral stress that causes the trouble. Also that in this case there was very little occlusal wear. My experience has been that in all cases, no matter whether tipped or not, they show occlusal or surface wear and it is by means of this surface wear that we are many times guided as to whether or not we wish to make a model.

W. T. Farrar, Louisville, Kentucky: The point I wish to bring out is the differences of occlusal wear in the mouth. In most mouths at forty or forty-five there are crowns and fillings and inlays and synthetic fillings, all of which show different aspects of wear. I have often wondered whether it would not be better as far as possible in our restoration to use the same material thruout the work. In doing our work in the past it has been the opinion among patients that the work should last forever. I think most work

should be replaced every five years, or the work should be checked up from measurements made during the previous five years or from casts.

Varney Barnes, Cleveland, Ohio: I have been taught by my father, Henry Barnes of Cleveland, to use beeswax and form a matrix over the teeth in one arch and then to exclude the teeth in the other arch. The wax matrix over the teeth may have to be reproduced from time to time, but I have found it very satisfactory, and have eliminated the carbon paper almost entirely. On taking out the wax matrix it is easy to see where it is punctured. Plaster of Paris should be used in taking casts of the mouth and it should be deep enough to show the gum contours. The plaster model should be as sharp as it is possible to make it. The matrix can be left in and the points on the matrix marked with a soft pencil. This must not be done all in one setting. In several cases I have had good results where there was mutilation.

Dr. Smith (closing): Dr. Bricker asked regarding the surface wear of the cusps in the case illustrated in my paper. There was considerable surface wear but it was not abnormal. It was not obstructing the range of occlusion to any great extent, nor had it caused a loss in the facial dimensions as is so frequently the case. The point I wished to emphasize in this particular case was the great amount of trouble caused by the elongation of one tooth and the tipping forward of another tooth. Abnormal surface wear is present in most cases of patients above thirty years of age. In many cases it is the prime cause of the traumatic occlusion.

I believe the occlusion should be checked up whenever, in the opinion of the dentist handling the case, it is necessary. The occlusion will not remain in an established position forever nor will it be necessary to check it up every month or so. The fact that the occlusion may have to be corrected every four or five years, however, is no reason why it should not be done. We have to look after other abnormal mouth or tooth conditions more frequently than that.

Dr. Barnes mentioned the use of beeswax applied in function as a means of getting a check on the occlusion. I believe one of the most important points in the whole procedure is the securing of impressions of the teeth when they are at rest and not when in function. The casts should represent the positions of the teeth as they are held in the arches when the mouth is open. Under occlusion as soon as the first cusps touch, the teeth begin to move slightly and change their positions. This is especially true if the supporting structures have a lessened resistance caused by trauma. The teeth will give in their positions under any or all of the three classes of force application. This is one of the main reasons why we use plaster casts and another sufficient reason is that with the instrument we use we can accurately reproduce all of the movements of the jaws. So mounted the casts can be held up and viewed from all sides as well as from the back, and obstruction points may readily be located.

The reason I make it a point to not go more than halfway up on the teeth in securing impressions is so that there will be no drawing when removing the impression from the teeth. I do not see what is to be gained by covering a greater area.

The point has been raised about the advisability of extracting that upper third molar. If you look at the illustration carefully it will be noted that the anterior part of the occlusal surface of that upper right third molar is in occlusion with the lower second molar. There was apparently no good reason for extracting it if the occlusion could be restored to normal. It could not elongate any farther. Moreover I was interested to see what result could be obtained by correcting the occlusion of that tooth.

A case must not be considered as finished when the occlusion has been corrected. Proper restorative work should be instituted at once, operations which will prevent a recurrence of this trouble.

INITIAL PREVENTIVE PREPARATION OF MOUTHS IN OPERATIVE DENTISTRY

By H. G. MORTON, D.D.S., Milwaukee, Wisconsin

(Read before the National Dental Association, Milwaukee, Wisconsin, August 15-19, 1921)

THE time has arrived when every member of the dental profession, whether a specialist in any of its complex branches, or just the everyday generalist, must recognize his responsibility in the field of preventive dentistry. Let us for the moment consider preventive dentistry in our present-day understanding of the subject.

Preventive dentistry implies all of the old functions that dentistry has represented for many many years, such as restoration of broken-down tooth structure, replacement of those lost, by means of the movable removable bridge-work, as well as the full denture itself, each one of these types of restoration representing preventive dentistry in its fullest meaning; our more modern function in the treatment of diseased tissue surrounding and contiguous to these teeth as represented in our modern therapeutics for gingivitis, pyorrhea alveolaris, etc., is preventive dentistry; the study and applications of principles applied to the occlusion of teeth as expressed by Black, Gysi, Supplee, Hall, House, Monson, and others is preventive dentistry; the study of diet for the child, in infancy as well as in childhood, also for the adult in all stages, and especially the mother and child during pregnancy, is preventive dentistry; a more intimate knowledge of internal secretions and their relations to the mouth and teeth is preventive dentistry; and last, but not least, our specific efforts to keep the mouth clean and a technic for the patient to use as his or her daily responsibility, at least until many theories and experimentations show a better way which we might term mechanical therapeutics, and it is of these last two phases of preventive work to which I wish to call your attention.

We use the term "preventive dentistry" because universally it best implies the necessary artificial forces which will prevent the breaking down of tooth structure, disease of surrounding tissues, loss of same, and necessary replacement during the varied periods of life, while in the adult the same principles of prevention apply with the addition of longer life to mechanical restorations, greater health to restored gum tissue, and added life to any impairment of mouth function.

That the rank and file of our practicing dentists have been negligent of this duty is evidenced every day when we see the mouths of our children, both insanitary and unsightly, and many premolars, as well as other teeth, broken down and in need of repair or removal, while the restorative work in both youth and adult is left without the added protection of hygienic measures.

The science of healing, as implied in the practice of medicine, would never have reached its enviable position without the preventive measures which have been both the vanguard and rearguard to its present attainments.

In the science of law are written many

pages of preventive legislation; municipalities and institutions are safeguarded by measures to keep the citizen out of harm, and every other branch of endeavor, private, corporeal, or municipal, is receiving its share of protection, prohibition, and prevention.

Thus in our practice of dentistry many of us have felt that these preventive measures should be left to the specialists. Nothing could be further from the truth, for every man, high or low, skilled or unskilled, specialist or generalist, must recognize that prevention must be the foundation upon which his future will depend.

If there is a question of doubt, or difference of opinion in the mind of the generalist on this problem, it is but fair to review the findings and experiences of our research workers in all branches of medicine and dentistry. True, we may still find the man who scoffs at bacteriology, but he is only one in a thousand; or the man who focuses his vision thru the specialized channels in which his environment has led him. In our modern school we have the findings of Rosenow, Billings, Pickerill, Hartzell, Price, and others. We are quite generally agreed that the abscessed tooth, the pus pocket around the gum margin, the ill-fitting crown and denture are causes of infection too serious to be held lightly; cumulative deposits on the surfaces of teeth with their abnormally high bacteria contents, to the extent of being what is called "a common carrier of contagious disease," are entirely too serious to be neglected, while resultant digestive and circulatory disturbances are of daily record. In past years it was commonly believed that the gastric juices would amply take care of all bacteria entering the digestive tract in over-abundance.

We must also frankly admit that many patients present problems that are both perplexing and disappointing, for with all the prevention and reconstruction they never reach a period of immunity. I would quote at this time from Herman E. S. Chaves' work on *Cast Gold and Porcelain Inlays* (chap. 22, p. 359):

> There are many people who are perfectly well; their daily life is often one of intense physical and mental activity, and yet they rarely, if ever, require therapeutics or mechanical attention. There are others who are miserably ill, mentally and physically; their daily life is one of continued attempt to guard against further encroachment by disease. They are continually under the care of some one ministering to some of their ailments successfully or otherwise. Some people for a period of time are perfectly well, then, for some obscure, and, to most observers, unaccountable reason, sicken or fall seriously ill, to recover in the same obscure and unaccountable manner and continue to live and to work, without further interference from disease, for their allotted number of years.
>
> In corollary with the above, there are many people whose dental apparatus is in perfect balance, mechanically expressed, in perfect occlusion, who never require any dental interference; still others whose teeth were in imperfect condition, as expressed in malocclusion, have had them placed in balance, and subsequently require an incessant amount of dental interference to keep on repairing and replacing parts of the continually breaking-down apparatus. Some people never pay any attention to the cleanliness or the environment of their teeth, and yet they never need to, nor do they seek dental interference for the alleviation of any dental disorder. There are others who are constantly having their teeth cleaned, their roots scraped, and their gums scoured, and still their teeth continue to present new cavities, new breakdowns, new dystrophies.
>
> Manifestly, the correction of bodily health and tooth health is not clearly understood.
>
> Many physicians, many surgeons, many dentists will readily admit the truth of the foregoing and attest to the statement that they are and have been constantly on the alert for something, some truth, the understanding of which would enable them to more effectively handle and efface bodily disorders.

Thus until we can find the truth our greatest reward must come thru reduction by artificial and physiological means, and it is of the first or artificial to which I wish to call your attention.

Our first effort then must be education. I quote from the *Harmonics of Evolution,* by Florence Huntley, on the

problem of education and its difficulties, as follows:

> Public teaching of any class of knowledge necessitates, first, a common language; next, a general community of ideas and sympathy of purposes, and, finally, a desire for instruction on the part of the unlearned. A common vocabulary and a community of ideas and purposes are, however, matters of slow growth. Neither new words nor new ideas can be forced upon the mind that is either unprepared or hostile. A great scientist may coin a few words and inject them into a language. He cannot, however, coin an entire vocabulary. A scholar may inject a few new ideas into the common mind. He cannot, however, immediately impart an entire science or system of philosophy.

I mean by that, education of our patients—to tell them all, day after day, about prevention and its meaning, to get them interested. I am reminded of the remark of one of our big business, publicity men, who said to me: "Isn't it remarkable how, if you just honestly believe in a thing and keep everlastingly talking about it, it just naturally succeeds." That must be our attitude with preventive measures if we believe them and preach them day after day.

Second, we must have a technic that is within the reach of all.

Third, we must have a technic of mouth care at home that can be taught to all, old and young.

For the generalist, and it is to him that we must look for immediate help, a simple classification of mouths is necessary, so that at a glance he places the patient in his proper position.

In this connection I would emphasize the training of our faculties of observation. I mean by this to more readily see every detail of a mouth at one glance, to cultivate accuracy of vision and of hearing. In physical diagnosis it is not the man who writes out the longest chart, but the one who clearly sees the important details and records them who accomplishes things; so with the dentist. We must train his eye to see the detail of inflammatory and mechanical malformation.

In classification under group 1, I would put all children and adults who show no definite breaking down or diseased tissue manifested by any of the stages of inflammation but in which stain or salivary deposits may be found on the teeth.

In group 2, I would include those children and adults who show any inflammatory stages, repeated and continued mucilaginous placques and deposits, ferments and erosions.

In group 3, I would include all cases diagnosed as pyorrhea, either in an active or passive state, and all other cases which require frequent and continuous observation.

This having been established every patient would be told that the first step must be prophylaxis and in group 1 the procedure would be carried out with the following instruments and materials: 1 No. 2 Clev. Dent. D. E. explorer; 12 Towner files C. S. from No. 25 to No. 36; 3 Jacquette scalers C. S. No. 1, No. 2, No. 3; 15 Kerr No. 2 handles; ¼ oz. spool Kuroris tape No. 3; 1 Kuroris cotton roll holder; 2 Kuroris prophylaxis polishers; 1 box Kuroris wood points No. 2; 1 box shoe pegs; 1 Dunlop paste; 1 Dunlop pocket packer; 3 medicament glasses; 1 temporary cement; 1 box No 1 jiffy tubes; 1 disclosing solution; 1 pound XXX silex; 1 phenlin oris.

With Jacquet scaler No. 1, all deposits are removed from the labial, lingual, and approximal surfaces of the six upper and six lower anterior teeth This instrument has a triangular blade and can be operated with a push and pull movement, and because of its delicacy, can be used without mutilation of tissue. When once studied, it is the simplest and most effective of minor scalers.

No. 1 can also be used on the upper bicuspids and molars, on the buccal, lingual, and approximal surfaces.

Nos. 2 and 3 are right and left angle instruments designed for the lower bi-

cuspids and molars. They will reach approximal surfaces readily, as well as buccal-lingually. In many instances No. 1 can be used on buccal-lingual surfaces.

This is the regular procedure in all cases of the first classification, and in many of the second and third.

My main thought is that one need not be a specialist (so-called) to effectively practice prevention. On the contrary, with three practical instruments, well understood, beautiful results are obtained.

In the second and third classes, where destruction has taken place, the Smith and Towner files are indicated, and their use, of necessity, requires greater familiarity with the planing of the surfaces, and its mechanical relations to the surrounding tissue.

The teeth are then polished, using for an abrasive XXX silex and the ordinary double-ended porte polisher. It may be necessary at this time to become more familiar with the digital, rotary, wrist, and stiff arm movements as taught to the hygienist, and which must be in the curriculum of every dental college, but which can be readily mastered by those who believe in prevention. Waxed silk is then passed between each tooth, carrying on it XXX silex, and lastly the occluding surface is polished with the ordinary brush wheel. The patient is then provided with a suitable brush and dentifrice and instructed in its use. I wish to emphasize the word *provided*—not told to get one from some obliging drug clerk.

The method of home care to be followed can be any of the recognized methods with which we are familiar. The important part is to see that the patient understands the method, and that on each succeeding visit he brings his brush with him to receive a lesson. He must also be told to brush his teeth after each meal and be given a reason therefor. This will be our second step in prevention. These patients should be notified when succeeding appointments are necessary at which time the same procedure will follow.

My method of teaching the patient how to use the toothbrush was published in the *Dental Items of Interest* (May, 1919) from a paper read before the American Academy of Periodontology at Chicago.

I differ from the methods most familiar to you in that the mouth is blocked into areas or positions, five positions on the buccal and labial surfaces of each jaw, and six positions on the lingual surfaces, each position being the surface the brush will cover.

The brush must be of two rows of spaced bristles which should be short toward the end, and the whole of medium size. The spacing is to more effectively reach approximal surfaces, and to aid in the cleansing of the brush itself.

The motion to be used is circular. The brush is wiped down or up, as the case may be, into position, and then rotated with a circular tendency, the rotation being limited to the length of the bristles. The operation should be performed before a mirror, and a count of ten given for each position in order to accomplish the work desired. The patient must be rehearsed in this work, and I find that my positions give me a check on areas which for some reason or other are frequently skipped. The occluding surface is then brushed in the usual manner. The dental floss should be used daily or as frequently as possible.

I have had no reason to change the method outlined, for it is specific and reaches a greater area of tooth surface.

In groups 2 and 3 you can readily see that a specialist might be necessary, yet for the generalist situated distant from the specialist, it is quite necessary that he become more familiar with the treatment of the second and third groups. With instruments, such as the Smith and Towner files, pocket packers, with the technic of ligation, and above all with a more intimate study of the phases of

occlusion, and the help of models, many of these troublesome problems could be eliminated in a most surprising way, and the line between generalist and specialist almost obliterated.

The great need at present is to prevent these mouths from being wrecked by our own neglect as much as by the patient's. Our efforts to take the burden of responsibility from the generalist by the use of the dental hygienist is meeting with wonderful success, and in such states where provision has been made for her, splendid results have been obtained.

If there is any doubt in your minds let me quote this time from Pickerill in *The Prevention of Dental Caries and Oral Sepsis* (chap. 21, p. 357):

> There can be no doubt that the gravity of the disease with which we are dealing is not recognized by the laity, and therefore not by governments. The extent of the disease is beginning to impress itself upon authorities now that the examination and possible treatment of school children is being undertaken at the public expense. So far, however, the cost involved in the treatment of dental caries by "fillings" on a universal scale has appeared to be so great as to hinder any other than isolated effects in this direction. But even now that it is beginning to dawn on authorities and public bodies that 90 percent of the children have carious teeth, the seriousness of what this means, the gravity of the ills to which the condition is precedent, is not in the slightest degree appreciated.
>
> It is perhaps agreed that "bad teeth cause indigestion" and that is as far as the sequence of events is followed. This is bad enough in itself, for how can it be hoped to rear a nation of mentally and physically strong individuals if, during the periods of growth and development, there is indigestion, and therefore non-assimilation of food? Added to this is the slow, insidious, but nevertheless sure, chronic septicaemia, brought about by the constant ingestion of toxins, pus, and bacteria, from a mouth containing numerous suppurating foci. It must be recognized, too, by the public that anaemias of severe type are frequently induced in the same manner; that tubercular glands of the neck, serious forms of Ludvig's angina, frequently fatal, are also caused by diseased teeth; that malignant disease (cancer) of the jaws, tongue, and lips, often originates solely from diseased teeth, and from this cause alone a large number of lives is lost annually; that a large number of disorders of adjacent parts—i.e., muscles, bones, nose, and eyes, and ears—are intimately associated with diseased teeth, either reflexly thru the nerves or by direct extension of the morbid process; that in conditions of unstable cerebral equilibrium the presence of diseased teeth is frequently sufficient to excite an attack of nervous disease, such as epilepsy, tic (spasms), hysteria, and some forms of insanity; that in addition to all these ills, of which large numbers of cases have been and are constantly being recorded, there is a chronic lassitude, lack of appetite, mild headache, constipation, and an inability to perform a normal amount of work, almost invariably associated with extensive dental disease. It is this relationship between cause and effect which requires to be driven home in the public mind. The disease itself is not always obvious, and the channels by which its effects spread are not recognized.

I quote further from the same author and the same book (p. 361):

> In addition, the preventive treatment of dental caries must be made one of the most important branches of the public health service. To initiate and organize a department to deal efficiently with this branch alone, would be a source of national economy.

It has been my effort in the foregoing remarks to emphasize the fact that the toothbrush cannot be relied upon to prevent dental caries in all cases, but until we find the truth, it is the most valuable agent at our disposal and the one that can be most universally used.

The amazing results of Howe's work on Dietaries, Thyroid Insufficiency by Leonard Williams, and the physiological factors as shown by Pickerill, and many others in their relation to preventive dentistry, make it self-evident to the thinking mind that the half has only been told.

And in conclusion I wish to say that if we, the practicing generalists, would only do our part in "artificial means of reduction," we could possibly prevent the dreadful ravishes of dental disease.

Discussion

C. W. Day, Tulsa, Oklahoma: We have one university in the United States teaching their students prophylaxis, preventive dentistry and oral hygiene. I would like very much for this section to pass a resolution

asking the Executive Council to insist and request our dental colleges thruout the United States to institute a chair on preventive dentistry and oral hygiene. It is neglected. What we need in this matter is that the dentists of this country be in favor of the subject, but how can this be accomplished if they are sent out with a sheepskin and without thoroly being imbued with the spirit of preventive dentistry. How can we have a vision regarding it unless it is being taught in school? I do not know of a college that is putting forth any special effort along this line. The colleges are not concerned.

Sidney J. Rauh, Cincinnati, Ohio: I would like to get a definition of the term "standardize." If I were working in dental societies I would define it as follows: Standardize is the use of the particular method which I advocate. We have gone along for a number of years, and we have talked toothbrushes. Do not attempt to standardize until everybody is willing to standardize with you, but do attempt to impress your own community with the particular method in which you believe. We must come to some method, some real standardized method, but do not let us call our methods standardized as yet, because they are not.

We come from communities, some very large and some very small, and on account of the enthusiasm of the individual we think we can accomplish results in that particular place. That is not true. Dr. Hyatt, of the Metropolitan Life Insuance Company, has a scheme, which has greater possibilities than any other, and that is their form of examination. Dr. Hyatt, if I understood him, had an idea if all of us would make our examinations with children and with adults and send them to their company where they have means of compiling these statistics, we would get those groups that have been referred to. The social phase of this question must be brought out. We are too extremely specialistic. We have to change the home of the poor man if we want results. He cannot have good teeth if he lives in a hut. We must go beyond our own profession and co-operate with all agencies; then we will have results.

In our town we have received as much recognition as we deserve, and in the exposition to be held there in October, we have received full recognition.

The oral hygiene movement of the United States is probably ten thousand times as big as it was fifteen years ago. There was practically nothing to do fifteen years ago. I have personally followed it that long. At first it was most discouraging. Now at these sessions one community after another has a showing of excellent work, each representative making a study of the methods being used, and making a decision for his own community.

C. M. Kennedy, Des Moines, Iowa: While I do not agree with Dr. Morton in all of his details, yet the most wonderful thing about it is that he has it systematized. You will notice, for instance, that he has systematized the use of the brush. The idea of the toothbrush clinic is to do the most good for the greatest number, and to do that you have to simplify your technic to the greatest extent possible. Our one thought should be to demonstrate and call the individual's attention to the location of the most vulnerable points on the tooth, and the necessity for brushing those areas causing the most trouble. In our lay talk we use the words front, top and back for the mesial, occlusal and distal surfaces, outside and inside for buccal and lingual surfaces. The public does not know that the front or mesial, top or occlusal, and back or distal surfaces are the three vulnerable surfaces. These must be kept clean. In our clinics we insist that the bristles be inserted into the interstices of the teeth with a rotary movement, so as to cover all sides of the teeth.

One criticism of Dr. Morton's paper is that I did not agree with his toothbrush method. Upon examination of the mouths that are brushed, you will find that a large percentage of the unbrushed areas are on the second and third molars. The third molar is criticized by many as being a useless tooth and worthless, whereas it is just as sound as any other tooth if kept equally clean. It is not kept clean, because it is not reached with the brush. I would recommend a brush with bristles of the same length. We do not want a shorter bristle at the toe of the brush for the posterior portion of the mouth, because the interstices between the first and second molars are the greatest distance.

Dr. Morton (closing): We are not going to accomplish anything until we can get everyone interested. The first step in this is education. If we leaven the bread, it must be thru this institution.

RADIOGRAPHIC STUDIES OF CASES FOLLOWING PULP TREATMENT AND CHRONIC ALVEOLAR ABSCESSES

By FRANK W. HERGERT, D.D.S., Seattle, Washington

(Read before the National Dental Association, Milwaukee, Wisconsin, August 15-19, 1921)

THE problem of the pupless tooth is the most serious one that has ever confronted the dental profession. Recent discoveries relative to focal infection from pulpless teeth are sufficient proof to show how blind we have been to the scientific side of our profession.

When the dental profession was confronted with the relationship between focal infection and systemic disease the X-ray was introduced to help solve the problem.

The number of X-ray machines in use five years ago by the dental profession was comparatively few. Consequently we were dependent upon the medical profession for our radiographs. The majority of these were taken by a nurse or technician and from the dental viewpoint were of little diagnostic value. The teeth were generally either foreshortened or elongated, and the films over-exposed and over-developed, or under-exposed and over-developed in the effort to bring out the detail that did not exist. This is generally caused by the lack of knowledge of the parts to be radiographed, to a hard tube and too great a spark gap.

It must always be borne in mind that a radiograph is a shadowgraphic representation of varying resistance to the X-ray and not a photograph, and should never be used as a positive diagnosis but as an aid in arriving at the conclusion.

The ability to interpret a dental radiograph is an accomplishment worthy of serious consideration and belongs absolutely to the dental profession for it carries with it a thoro knowledge of the internal anatomy of the head. Dr. M. H. Cryer has published a book entitled *The Internal Anatomy of the Head,* which should not only be in every dentist's library, but should be read and studied and then re-read and perused until the dentist knows what Dr. Cryer has tried to impart.

The majority of the medical profession are willing to admit their inability to read and interpret the dental radiographs and are calling upon the dentist to help solve the many problems confronting them. Are you willing and qualified to help them? The layman was quick to grasp the situation of the absence of laws to govern the practice of radiography. Consequently, we had X-ray specialists and laboratories that sprung up overnight that would give a complete diagnosis not only to the dental and medical professions, but the laity as well, with the result that thousands of teeth have been lost that should have been retained

and tens of thousands retained that should have been extracted.

To the dentist endeavoring to do root-canal work, the X-ray is a valuable and absolutely indispensable adjunct, and no root canal should ever be entered that has not been previously radiographed to determine the number, length and direction of the roots. I believe the time has come when a complete set of radiographs should be a part of the records of each and every patient treated, for the vital teeth of today are to be the diseased and pulpless teeth of tomorrow.

Let us pause to review the root-canal work of the past twenty years. In the past two years it has been my privilege to examine over twenty thousand radiographs, and I have arrived at the conclusion that the removal of pulps and the filling of the canals have been woeful and dismal failures. The reason for this is due to the lack of instruction and the importance of asepsis in this class of work as taught in our dental colleges.

We can all remember when it was considered, and we were taught, that it was next to criminal to crown or place an abutment for bridge-work without first devitalizing the pulp, and there is not a dentist who has not been guilty of destroying the pulp to place a masterpiece of bridge-work.

It has been my privilege to visit the majority of the dental colleges in this country. There I have seen students attempting to remove a pulp or treat a canal without the first precaution of asepsis, viz., the application of the rubber dam. I can well remember one of my college professors saying: "Boys, I have come to the conclusion that it is not so much what you put into a pulp canal as it is what you keep out," and truer words were never spoken. Our college professors from the lecture stand told us that it was necessary to remove the deposits from the necks of the teeth, to dry the teeth with alcohol, to apply the rubber dam and then to sterilize the field of operation; it was also necessary that the burs, brooches and instruments should be sterilized.

How many of you ever had a professor or demonstrator show or assist you in applying the rubber dam? Did they inspect your instruments or see that your hands were free from the possibility of carrying infection to your field of operation? Did they see that your brooches, burs, and cotton, as well as your engine hand piece were sterile, and last of all, were your canal points and filling medium from a sterile container? Is it any wonder that young men after leaving college have gone out into highways and byways of this great land and laid up thousands upon thousands of foci of infection for people to carry around, who, at last broken in health, seek the help of the medical profession, which immediately condemns the dentist and everything that he does, forgetting that he that lives in a glass house should not throw stones. I would not have you believe that I think it is impossible to remove a pulp and fill the canals but until we devise some technic far more adequate than any that has been or now is in vogue, and not until we are willing to treat it from an absolutely surgical standpoint with all it implies, can we hope to approach the goal. This requires time, patience, and skill, and not until we as dentists have the moral courage to demand remuneration for a highly skilful service can we hope to accomplish the end.

Now let us consider for a few moments the interpretation of the radiograph. To be able to interpret the radiograph, requires a thoro knowledge of the part radiographed under normal conditions, for diseased conditions are deviations from this state. There are many ana-

tomical landmarks that are often mistaken for foci of infection by those who are not familiar with them. As I have previously stated the majority of films are over-exposed and over-developed, giving a dark heavy radiograph that when placed on the shadow box does not trans-illuminate and bring out the detail of the parts radiographed. The value of 98 per cent of radiographs are lost by the slipshod manner in which they are viewed. The average dentist upon receiving a radiograph will make his diagnosis by the window or electric light method, thereby losing all the fine detail.

There are very few shadow boxes constructed along proper lines for all the light should be reflected instead of direct. The reflected light will give an even illumination whereas the direct light will give an over-illumination in one part and lack of illumination in another. I have never seen a shadow box on the market constructed along this line, but discovered that the Kodak Safelight Lamp, manufactured by the Eastman Kodak Company, can be transformed into an ideal shadow box by removing the safelight and substituting a piece of opal glass. A 50-watt white nitrogen lamp placed within the box will give a wonderful light. I also want to enter a plea for the exclusion of all light, except that which comes thru the radiograph. Much better readings are possible in a darkened room, and with the aid of the magnifying glass to bring out every detail we are able to apply some of the knowledge that Drs. Duke, Ivy, Raper, Cryer, Thomas, Noyes, Black, and others have prepared for us.

Discussion

R. Boyd Bogle, Nashville, Tennessee: We should have a definite knowledge of the anatomical structures in the tissues with which we are dealing.

I call to mind that once I saw in an office a man who was doing much of this kind of work who radiographed a representation of a normal mouth. It goes without saying that if we are to recognize pathology or disease we can only do that by a comparison with normal conditions. I refer to that because many of you do not pay as much attention to normal conditions as you should. We must know health before we know disease. We must know what normal conditions should look like in a radiograph before we know what a different form from normal is.

We have seen a very wide variance in radiographs. I do not mean this as a criticism. I believe there is a definite way to do things in order that we get definite results. If we make a picture for Dr. Smith today, we should know exactly what our milliamperage is, so that if he comes back we can duplicate the same technic. We should have a record on the envelope which incloses the X-ray.

We are told and know that at 65 and 68 we get the best development with a normal exposure. The essayist referred to the fact that many X-rays were over-exposed and many over-developed.

Radiographs are very necessary in the practice of dentistry. They are very necessary in orificial work. They are very necessary in many cases in order to determine what the pathologic conditions are. When a thermometer or any solutions get old, discard them and make new. They are very much cheaper than time and filaments.

C. O. Simpson, St. Louis, Missouri: Dr. Hergert has very capably presented several phases of an important, and the least developed branch of dentistry. As he correctly told you, from incompetency and careless technic most dental radiography does not supply all the information obtainable thru this medium. No one will dispute that the assistance offered by X-ray examinations is indispensable to thoro canal operations and to the study of post-operative results of the conservative treatment of pulpless teeth. The most valuable portion of this aid is lost if the radiographs are so inferior that only gross abnormalities are disclosed. The slight pathological manifestations, and the borderline cases are those in which the dentist can render the greatest service.

The data which accrues from the radiographic evidence of changes occurring around pulpless teeth is the principal means of perfecting technic in canal treatment and filling. Because a large proportion of canal operations in the past have proved a failure does

not justify the condemnation of all teeth without pulp or even periapical complications. Admitting that approved methods are too exacting for the skill of some operators and for the financial resources of many patients, the results of modern canal therapy and surgery offer ample reason to anticipate the ultimate solution of the problem.

The plea for complete routine radiodontic examinations may be emphasized by mention of the opportunity for comparison in different regions of the same mouth, the disclosure of incipient caries and periodontal lesions, in addition to the periodic radiographic records which are necessary to efficient oral supervision and care.

The diversity of opinion in the interpretation of radiographs demonstrates the unsettled state of the science. An acceptable knowledge of interpretation can only be acquired by diligent study and extensive experience, and doubtless there is still marked progress to be made in the accurate and complete reading of this evidence. The role of radiodontia in the evolution of dental practice warrants a more serious consideration than the profession has yet given to the subject.

E. D. Coolidge, Chicago, Illinois: I would like to state that the radiographer for the dental public, like the oral surgeon or the man who operates considerably in the hospital, is apt to form a wrong impression of a subject. A man who sees so much of the poorest side of any problem is apt to be biased in his opinion regarding the standing of that class of work.

For instance, a few years ago when the oral surgeons were getting so many cases of rheumatism and arthritis in the hospitals they condemned all root-canal fillings and extracted all of these teeth. In a short time they found that people with extracted teeth had about the same troubles as people with teeth, and you will find that a majority of the oral surgeons of today and a majority of the better physicians and surgeons are not as radical regarding the extraction of teeth as they were five years ago. Their viewpoint has changed considerably and they are studying conditions more since they have seen many of these cases following extraction. A radiographer who radiographs for many patients from many dentists is apt to see 90 per cent of imperfect root-canal work, and perhaps of that poor root-canal work 75 per cent of the roots are abscessed. But that does not prove that root-canal work is wrong or that it ought to be discontinued. Just because a large majority of the root-canal fillings of the past are imperfect does not mean that at the present time there are not hundreds of men all over the country doing excellent root-canal work.

A REPORT OF LABORATORY FINDINGS IN INFANTILE SCURVY, OR BARLOW'S DISEASE

By HARRY BLOCH, B.S., D.D.S., St. Louis, Missouri

(Read before the National Dental Association, Milwaukee, Wisconsin, August 15-19, 1921)

OF THE disorders of metabolism, involving molecular changes, and resulting in disturbances of function, as well as in structural alterations, infantile scurvy, no doubt, offers the greatest interest to us, in contrast to other deficiency or nutritional diseases, such as pellagra, beriberi, or rachitis.

Any disturbances in the process of metabolism will invariably give rise to varying diseased conditions of either major or minor consequence. It should be borne in mind that metabolism may be divided into two phases, one the building up or constructive process, wherein the simple substances are built up into complex ones, this being known as anabolism, secondly the breaking down or destructive process known as catabolism. To conserve the bodily economy it is manifestly necessary that new substances be continually assimilated by the human organism. These in their turn are to be broken down into various simpler substances, while the waste products must be excreted.

It is due to the presence of various digestive ferments in the gastrointestinal tract that the assimilation of food is made possible, and the relative health of the individual is dependent upon this assimilation of proper food. In cases wherein food is lessened in quantity and quality certain manifestations of a pathological consequence are bound to ensue, emaciation being but one of the many symptoms, while the excretions and secretions become very scanty. The leucocytes become diminished in number, altho the erythrocytes may remain relatively normal in quantity, this probably being due to the loss of blood serum.

The etiology of the disease is obscure. Some have felt that it was due to an absence of those ingredients in the food which are supplied by fresh vegetables, and the vitamines. Whether the potassium salts or the absence of the organic salts present in fruits and vegetables play the important role has not as yet been definitely determined. Wright has brought forth evidence that it may be due to an acid intoxication, while Nansen and his associates contend that it is not due to an absence of fresh vegetables or the salts of fruits and vegetables. These individuals lived for months under the most unhygienic surroundings, partaking of fresh bear's meat and bear's blood. Others claim the disease to be due to an organic poison found in the food as the result of fermentation and putrefaction, and the third theory for the causation of the disease is, that it might be due to a specific micro-organism. Of course, it should be remembered that other factors of a predisposing nature play more or less of an important role, such as prolonged fatigue, congestion, improper domiciliary, and dwelling in damp and cold quarters. Nostalgia may be an important element. Starvation in itself does not necessarily bring about scurvy.

In nearly all of the cases the blood shows a very marked anemia, accompanied by a reduction in the number and change in the form of the red cells (oligocythemia), and occasionally lowered alkalinity and coagulability are to be observed. It is to be associated with a reduction of specific gravity, and hemoglobin and insolid elements (figures will be given in a later report). Hydremia and an increased tendency toward os-

mosis are equally constant features. Generally speaking, the anemia that is observed may be produced by the loss of the fluid ingredients of the blood by transudation or in bulk by hemorrhage, or it may be secondary to hemorrhage, to exudative processes and to prolonged malnutrition. Defective hematogenesis may be considered as well as excessive hematolysis. In the mild form of anemia that may accompany the disease the red cells are deficient in hemoglobin, the blood is pale or watery in appearance, the cells appear as very pale disks or as slightly refractive rings about a colorless central area. Dried preparations when stained with eosin show a very narrow red ring encircling a central area which is entirely devoid of hemoglobin. Differences in size and irregularities in shape of the erythrocytes may likewise be observed. In the more severe forms microcytes and occasional poikilocytes may be observed. The percentage of hemoglobin is decidedly reduced, nucleated red cells are to be found in the blood in almost all forms of anemia, and their appearance would tend to indicate a regenerative activity on the part of the blood-producing organs. The appearance in large numbers of nucleated red blood cells during extra-uterine life, altho abnormal, has been very often regarded of favorable import in disease; when complicated by other diseases pathological polynuclear leucocytosis may be observed. The degree of leucocytosis varies with the nature, variety and number of lesions present as well as with the height of the fever associated with the infectious process. In general, leucocytosis may be looked upon as an effort of the blood-producing organs to protect the body against micro-organisms, and circulating toxins.

In a goodly number of cases an excess of phosphates in the urine is to be observed, the color is relatively high, and albumin is very often noted.

Retrogressive tissue changes in the form of cellular metamorphosis resulting in the protoplasm of the cell being transformed into abnormal substances; fat may be especially noted in the liver, kidneys and heart. Parenchymatous degeneration or cloudy swelling and fatty degeneration are the most prominent retrogressive processes taking place during this disease; both glandular cells and the cells of the stroma may undergo parenchymatous degeneration, but they may not necessarily be equally affected (as a matter of fact the glandular cells are more prone to injury). Microscopically the cells appear larger, somewhat swollen and more granular. The nucleus is often obscured, and the function of the cell is impaired. If the condition of cloudy swelling persists, fatty metamorphosis invariably follows. An increased amount of fat is observed in the cell, usually of the parenchyma that is diseased, which interferes with the ability of the cell to dispose of normal quantities of food. In fatty degeneration the fat that is observed in the cells may be formed by the disintegration of the protoplasm, or it may be taken up from the blood and remain such, due to the fact that the ability of the cell to assimilate it has been interfered with. This condition may be due to the lack of a supply of nutriment as diminution in hemoglobin or of the corpuscles, or the blood supply may be decreased. Likewise, the cell may be unable to use the material that is placed at its disposal, and this in turn may result from bacterial toxins, inorganic poisons, and inhibition in the vital capacities of the cells. Organs undergoing fatty degeneration, tho generally smaller, are often increased in size and are usually pale, soft yellow, flabby, and often result in caseation. Microscopically the cell protoplasm will contain a number of minute droplets. These do not coalesce. The nucleus is eventually destroyed, and the entire cell may be broken down into a fatty granular mass. The tests for fat are Sudan III which stains it scarlet, or a 1 per cent solution of osmic acid, which stains black. It is soluble in alcohol,

xylol, and ether, and insoluble in water, acids, and alkalies.

Hemorrhagic infarction of the spleen may be observed. The obstructed area becomes full of blood which in turn may be caused by the back flow of blood from the veins or from free capillary anastomosis, or there may be some degeneration of the vessel walls. When a portion of the organ is deprived of its blood supply or nutrition, necrosis must of necessity ensue. Usually an area the shape of a cone is observed with the apex toward the inner portion of the organ, and the base toward the external surface. Infarcts are firmer than the remaining portion of an organ, and should be looked upon as areas of degeneration and inflammation, caused by embolism in an end artery or where there is inadequate anastomosis. It is primarily the act of obstruction that constitutes infarction and must be so sudden as to prevent any collateral circulation from occurring.

The bone marrow also becomes involved, losing its bone-forming elements; it is converted into an edematous fibrous tissue in which the blood vessels and osteoblastic cells seem relatively few. The result is that bone formation becomes arrested, and as resorption normally takes place, the entire structure will become rarefied.

The lack of orderly invasion of the cartilage columns is especially noticeable at the epiphyseal line. Often there may be an irregular invasion, and an osteogenetic area becomes wide where a network of capillaries is present. Few and scattered laminae are formed. Hemorrhages are observed in the joints beneath the periosteum and in the bone marrow. Quite often the periosteum is raised above a large portion of the shaft of the bone. The growth of the periosteum often replaces the clot; the cortex, however, tends to remain rarefied. Normal results may be looked for after the proper diet is inaugurated. Also a rearrangement of the cartilage cells in their columnar order, and the reappearance of blood-forming cells, and capillaries with an abundance of osteoblasts in the impoverished bone marrow, all aid in their restoration to the normal.

From the mouth smears stained with methylene blue, Gram's, and acid, fast various stains are found dependent upon the intensity of the infection, the resistance of the host, and the mode of infection as well as the diet and hygiene. Some cases will show a greater number of bacteria, others less, while some will show different stains than other cases: the staphylococci, streptococcus pyogenes, also salivarius and mitis, occasionally the tubercular bacillus, diphtheria, Plaut-Vincent organism, various spirochetes, and the pneumococcus. An arterial hyperemia is often observed which is first preceded by acute exudative inflammatory process. This hyperemia if continued may be followed by (1) hypertrophy of the part due to increased nutrition, (2) parenchymatous degeneration from over stimulation of the cells, and (3) proliferation of the connective tissue around the blood vessels. As the condition progresses a pseudo-membrane is formed about the gingiva, extending posteriorly to the molar region. Often the buccal parietes, the hard and soft palate, and the fauces may show slightly raised ulcers of various sizes, and with a tendency toward hemophilia when the layer is removed. Hemoptysis and progressive liquefaction necrosis are often common sequelae if the condition be improperly treated or permitted to continue untreated. Noma and complicating system infections as gastroenteritis and nephritis bring about a general septicemia invariably with fatal termination.

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THE PRESENT STATUS OF PORCELAIN IN DENTISTRY

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THE porcelain art in dentistry is today no farther advanced, so far as the general practitioner is concerned, than it was fifteen years ago and a clear logical reason for the comparative disinterest on the part of the profession generally has not thus far been offered. If the public could be educated to the possibilities of porcelain in dentistry this general apathy would soon disappear and the personnel as well as the profession of dentistry itself would change considerably for the better within a very short time. To become a good porcelain worker one must develop the finer side of one's self; he must pay more attention to detail and be careful in every procedure connected with the work. Development of technical skill in the art of porcelain naturally helps one to become more proficient in all other operative and mechanical accomplishments in his profession. Porcelain will not stand the abuse that other materials used in the practice of dentistry seem to be subjected to constantly, and therefore if it were in general use for porcelain jackets, inlays where indicated, and in bridge-work where possible, either the dentist would develop into a more skilful man or be forced out of the high position he feels that he now occupies. If the porcelain art in dentistry is, as its most ardent champions claim, capable of such wide application, then the present status of porcelain, aside from the manufactured "ready to wear" offerings, is a severe indictment of the profession itself. The present day admirers of the ceramic art in dentistry seem to be divided into two groups, consisting on the one hand of really capable porcelain workers who are keenly alive to the possibilities of the material and the really wonderful and practical results to be obtained, and, on the other hand, that group the members of which recognize that it has merit but thru inability, either real or mental, to take advantage of its use, they admire it thru fear. They are literally afraid of it and pass it by for no other reason.

It is not my purpose in this paper to plea for porcelain in dentistry but rather to show why it has traveled in cycles ever since dentistry became a profession; why it has been on the crest of the operative wave for a period of seven years only to be relegated to a few loyal and far-seeing advocates for almost two decades; why the great majority have left it severely alone but without criticism. They admire it but do not avail themselves of its wonderful possibilities. It is not difficult to imagine, at least, how much farther the profession would be advanced if we had given the same amount of attention to porcelain work during the past fifteen years as we have to gold inlay work, for instance. I am referring now to the profession in general. It is true that individuals in all localities in this country and abroad have developed themselves in this work to a very high degree. Such names as Spalding, George Thompson, Schneider, White, Avery, Argue, Starbuck, Goodman, Raymond, Capon, Hartley, House, Vehe, Buell, Fickus, Reeves and a few others are

familiar names of really great men in porcelain at this time, but they, like their names, are as widely scattered as to location as can be and instead of but one or two really good men in this line of work in a community there should be scores.

About 1899 or 1900 there crept over the profession a wonderful enthusiasm for porcelain inlay work and for a period of two or three years more attention was given this material than any other in dental operative work. No community seemed too small to have a porcelain worker in dentistry and porcelain inlay and crowns were baked in blast furnaces, alcohol flames, and electric furnaces, according to the size of the town of the practitioner. Two groups immediately sprung up, one advocating a so-called high-fusing porcelain which fuses at about 2100° F., and one the low-fusing or Jenkins, which fuses at about 1850°. The higher fusing of the two proved a really excellent porcelain, and for inlay work nothing has been offered by manufacturers that seems quite as good for shade at least. Jacket crowns seemed to be carried into popular favor on this wave of enthusiasm and for a while enjoyed quite a conspicuous place with the dental restorations of the day. In 1906 a very perceptible diminution in the number of men was noticeable who were really enthusiasts in this line of work, and the number continued to decrease as time went on.

Let us attempt to analyze the causes of the downfall of this very interesting line of work. What made the dentist give it up? Was it because of the material itself, the operator himself, the teacher, or a combination of the whole?

Failure to recognize its limitations undoubtedly was a potent factor in causing the early enthusiasts to discontinue the use of porcelain in inlays and jacket crowns. These operators overestimated the edge strength in porcelain inlays and seemed to depend too much upon the adhesiveness of cement. The profession seemed to have at first plunged headlong into the adoption of this material for inlay work without having the slightest idea of cavity formation or of what the material was really capable of. Some of you can perhaps recall that instructors in this line of work during its incipiency advocated and taught the saucer-shaped cavity form, claiming that a porcelain inlay cemented into such a cavity under pressure would adhere almost indefinitely. That one theory attempted in practice did more to discourage the use of porcelain by dentists than any other one thing, and it is a significant fact that but two capable works on cavity preparation for porcelain inlay work have been published to date. To quote from my former discussion of this subject several years ago: "Even tho the operator recognizes the possiblities and limitations of the porcelain inlay, he is still confronted with the necessity of knowing and executing perfect cavity preparation for porcelain work; making perfectly adapted matrices; possessing an ability to fire porcelain and often two kinds of porcelain in the same case with widely different coefficients and he must have acquired the rare skill of setting and cementing a porcelain inlay properly." Many operators who were resorting to a wholesale use of porcelain as a filling material were not the masters of many of these qualities and to the men who really learned thru constant study and application the necessary requisites for successful results, it has been no surprise to see porcelain fall into disrepute in the hands of the incompetent.

In 1921 we find that many professional laboratories have sprung up all over the country and more and more porcelain work is being done. Articles on porcelain are becoming more frequent before the different dental societies and it is a rare thing to see a single dental publication of the day in which baked

porcelain or some phase of technic in this work is not mentioned. The pendulum has swung back and today finds the porcelain workers in dentistry agreed upon the fundamentals, at least, that constitute the early stages of success, namely cavity preparation, indirect method for convenience of work, firing of porcelain, etching, and cavity locations.

Cavity preparation.—It is necessary to have perfectly sharp borders at right angles to the surface contour of enamel, adhering to the cube-shaped foundation as near as possible. Always a good seat in cavity and plain rather than complex cavity border lines are fundamental essentials.

The indirect method has been adopted by most of the present-day workers for the reason that it is possible to reproduce accurately a cavity in amalgam and thus work to greater advantage out of the mouth.

Firing of porcelain.—Pyrometer aid and firing no farther than a high biscuit at any time until the final bake are two accepted adjunctive fundamentals to bring out the proper shades and produce the strongest baked porcelain. The technic of baking has changed but little, if any. Pencil or plaster of Paris are considered to be the best means of absorbing moisture. As the plaster is dry it absorbs the moisture from the wet porcelain readily. No plaster particles become incorporated in the porcelain for the reason that the plaster, being the absorbent, takes away rather than gives anything to the wet porcelain.

Some present-day workers seem to think that the addition of starch (saturated solution), tragacanth jelly and similar materials are a help in porcelain work. I am convinced that these aids are rather imaginary than real. For those who wish to try the tragacanth jelly the following formula has been suggested: gum tragacanth ⅛ oz., alcohol ½ oz., water 1½ oz.

Cavity locations.—At this time it is quite generally accepted as good practice to set and cement porcelain inlays in all labial and buccal cavities, both maxillary and mandibular; all approximal cavities, large enough and not including cutting edge, in the twelve anterior teeth, which includes the six anterior of both maxillary and mandibular; some bicuspids that bring cavities into view when lips are distended, and occasional incisal angles when occlusion will allow.

The color problem is the same today as it was twenty years ago, at least from a teaching standpoint, that is, conveying to another what experience has taught one in this line is just as difficult today as it would have been then. The dentist has been taught to select his colors and shades by shade guides composed of teeth, each having a combination of colors, the foundation or orange and the one or two incisal shades. If he fails to match a shade without analysis he does not match the case at all for his methods are almost inherent. The proper blending of colors is difficult to teach and the status of this part of the work remains the same, i.e., individual study born of experience and some natural ability are the qualities necessarily indispensable.

There is an old saying that "the world needs not so much to be informed as to be reminded." Every dentist has been impressed at times with the unusual strength exhibited by porcelain under certain conditions and I would feel myself quite remiss if I did not give to you the findings of Fickus of Pittsburgh on the relative crushing strengths of porcelain, amalgam, and silicate cements.

TESTS

The machine used in making these tests had a registry of one thousand pounds and in all of the experiments the samples contained 125 cu. mm.

AMALGAMS

The first experiment to determine the crushing strength consisted of six tests made after twenty-four hours, setting of each of four high grade amalgams. The result was: general average, 678¼ lbs.

SILICATE CEMENTS

The second test was made on four of the most popular silicate cements. Six tests of each of these cements were made, after a setting of twenty-four hours. The following is the result: general average, 448¼ lbs.

PORCELAIN TEETH

The third test was made on six cubes cut from high-grade porcelain teeth. One sample, the lowest is recorded: The average, 942 plus lbs.

INLAY PORCELAIN

The fourth experiment consisted of six tests of high grade inlay porcelain. The result was: average record, 716 lbs.

From the figures presented in these tests, it can be readily seen, that the possibilities of porcelain to sustain the stress of mastication, are greater than those of the silicates or amalgams.

In continuous gum work, aside from the progress made by the manufacturers in furnaces and fire clays and the present multiplicity of methods for attaching the teeth to the platinum base, work of this nature is produced and finished no better today than it was twenty-five years ago. Regarding the methods for attaching teeth to the base in continuous gum work, the method of boxing them with platinum and baking on tooth with porcelain to properly seat same on the base as written of and advocated by Dayton Dunbar Campbell, of Kansas City, and the method using platinum strips of No. 28 or No. 30 gauge platinum baked into the teeth and soldered to the platinum thus allowing adjustment for occlusion at almost any stage of the firing as used and advocated by W. A. Giffen, of Detroit, are two methods worthy of mention. Other technic in continuous gum work has changed but little and what change there has been made has had no effect upon the status of porcelain itself in this phase of dental work. The same formulas for producing body and enamel for continuous gum work that were used thirty years ago are the best we have today. This is largely due to the fact that but very few men have ever made it a practice to construct a large number of dentures employing continuous gum. The demand for this material, therefore, has been so comparatively light that improvement in manufacture was not to be looked for. However, whether the continuous gum set of dentures was made thirty years ago or today, it is one of the most aesthetic productions in dentistry, and when well done it is invariably admired.

In the field of bridge-work, porcelain is coming more and more into use. While the idea is a very old one, it is only during the past few years that the profession has really awakened to the capabilities and advantages of baked porcelain other than stock facings in the construction of bridges. Porcelain roots, glazed highly and filling a part of the space formerly occupied by the natural root as a part of fixed bridge-work, is considered good practice today. Baked porcelain individual saddles highly glazed together with tissue rests, porcelain contact with soft tissues wherever possible, are not to be condemned today but rather encouraged, and recently we have examined removable bridges where this application has been made with wonderful results. We have learned to recognize highly glazed porcelain as our most valued ally in constructing bridgework that is expected to remain clean in the mouth. It is the only material employed in dentistry to which soft food does not adhere, and for that reason alone it should have the constant attention of any conscientious dentist.

Perhaps the great interest in porcelain exhibited in dentistry at this time is owing to an awakening on the part of the profession to the wonderful possibilities of the so-called land or jacket crown. Since Spalding in 1903 suggested a square shoulder for the land crown many changes have come in the technic, at least, until now the mechanical construction of a jacket crown has become comparatively simple. Land contributed much to the profession when he fearlessly advocated this beautiful res-

toration, and time has shown us that the jacket crown operation is one of our most valuable procedures. The old method of making a matrix over a cone-shaped instrument, soldering and then burnishing on the preparation in the mouth, has during the past decade, been superseded by the indirect method, the amalgam model and the tinners joint without solder for the matrix. Another old method that has been discarded and to the great advantage of the men of the present-day school is the ground facing for the labial and buccal part of the jacket crown. A regular vulcanite porcelain tooth was utilized, grinding out the pins, leaving a thin veneer with the glazed inciso-lingual surface intact, which made it necessary to fill only about two-thirds of the lingual with new porcelain to complete the crown. Some of these crowns were constructed very skilfully but are not to be compared with present-day built-up crowns.

While there seems to have been developed a multiplicity of technics, in fact almost as many as there are men teaching it, there is really very little difference in the several methods now prominent. From observation we have come to the conclusion that different technics seem to be judged by the skill of the teacher or clinician rather than by the real merit of the technic.

Porcelain jackets can be successfully used for vital cases on the ten anterior maxillary and the ten anterior mandibulars. They are the ideal crowns for vital first superior bicuspids. The porcelain jacket crown has enabled many operators to retain the vitality of this particular tooth when the only alternative, when aesthetics were concerned, was to dentalize and place a stock porcelain crown.

Except in cases of erasion or malformed enamel, porcelain jackets of vital molars are decidedly contra-indicated. The vital pulp must have sufficient natural dentin surrounding it to form a core on which to place the jacket, and I have never seen a case badly enough broken down or decayed that still contained enough healthy dentin to both protect the pulp and give strength enough to support a porcelain jacket crown. Devitalized teeth with destroyed natural crowns in any position in the mouth are, after proper care of the canals, more beautifully restored by placing porcelain jackets on them over cast gold cores. For beauty and perfect restoration of natural conditions, a stock porcelain crown is not to be compared with them.

Any method that uses fire clay or similar materials for investment and to prevent shrinkage is not good practice for the reason that it precludes the possibility of "try in" and adjustment in the mouth for adaptation, approximation and occlusion as well as the equally important factor, character, before the final glaze. There is no chance for final shaping for dental anatomy and environment characteristics owing to the necessity of removing the fire clay on which the crown was baked which brings with it the platinum matrix in whole or part and the crown must be accepted or rejected without the possibility of correcting imperfections further.

It is not considered good practice to adapt jackets of porcelain for the purpose of correcting mal-alignment. Anatomical characteristics and harmony are not possible under these conditions and there is great danger of encroaching upon the pulp. I have seen many practical cases, also photographs and radiographs of mal-alignment corrections done by the most skilful men, and feel that in no single case was a really harmonious result accomplished. The X-ray has been a valuable adjunct in preparing cases for jackets. The size and position of the pulp is arrived at and very frequently pathological conditions are discovered that might have gone unnoticed otherwise.

During the past five years porcelain crown workers have recognized the ab-

solute necessity of carving teeth true to tooth form, but that is not enough. I have laid great emphasis upon the necessity of carving porcelain teeth true to environment and character of the individual mouth. To carve from extracted teeth is a splendid thing for practice to get the correct perspective and impress upon one's mind indelibly dental anatomy as it really is, but all of this should be first mastered out of the mouth and not in connection with any practical case. In constructing a jacket crown it is good practice to make perfect labial or buccal and perfect lingual impressions of adjoining teeth and pouring up casts or replicas to be used constantly to aid in carving the individual tooth in hand. The early carving experience from natural teeth is thus supplemented by the replica work in plaster.

It is my opinion that the overlap crown, which leaves part of the lingual plate of enamel intact, is to receive more consideration and thought in the future. There is a gradually growing body of men in the profession that believes that the entire stripping of enamel is harmful to the life of tooth structure, and while we know of many cases where the teeth have remained vital under jackets for a period of twenty years, we have no evidence that disintegration has not taken place and that resistance has not tolerated the crown rather than what has generally been supposed, the crown preserved the vitality. Whether a lingual tooth needs light vibrations, or aerobic conditions, or both, I do not presume to say, but the time has gone by when we wish to scoff at those who think that it is absolutely necessary that a lingual vital tooth depends upon certain specific conditions for its health and longevity.

As to the entire stripping of enamel for porcelain jacket crowns, it seems that most men believe in this procedure at this time and I fully concur, but it is our opinion that within the next few years many changes are to come in porcelain procedures and that its greatest function will be in the restoration of enamel and that alone. Careful preparation and the so-called color problem will ever be the most important consideration that confronts us.

The status of porcelain in 1921 therefore briefly is this: Porcelain inlay work is gradually coming back in a more safe and sane way. There has been no improvement in the color problem. Staining porcelain with real porcelain, rather than the so-called china paints, Italian oils, etc., is being developed in a wonderfully successful manner and represents one of the most distinct steps found in the present-day porcelain art.

Continuous gum work from a porcelain standpoint has not advanced in a quarter of a century.

In bridge-work really great progress is being made at this time and in jacket crown work much has been done both by the teacher and the manufacturer; greatly improved materials have been originated and are better understood.

The greatest changes and improvements are to come in the jacket crown field and it will continue to be one of the most interesting and able arts in dentistry.

ORGANIZATION OF THE DENTAL FACULTY

By FREDERICK C. WAITE, Ph.D., Cleveland, Ohio

(Read before the National Association of Dental Faculties, Milwaukee, Wisconsin, August 13, 1921)

IT MIGHT be said that the main factor that distinguishes mediocrity from efficiency in an educational institution is organization; organization of administration, of teachers, of instruction, of courses, and of the subject-matter of each course.

The four cornerstones upon which a dental school rests are teaching staff, curriculum, student body, and material equipment. Each can be markedly improved by proper organization, but at this time I wish to confine myself to the first of these four elements of strength, i.e., the organization of the teaching staff both in its relation to administration and to the instruction of the students.

It is a truism that a faculty must be made up of men of different lengths of teaching experience. Likewise in any group of men, such as a teaching faculty, there must be a variation in the ability of the men, i.e., ability from the standpoint of membership in the teaching staff. This difference of ability is due to many factors, some of which may be mentioned:

1. Differences in hereditary and innate intellectuality.

2. Differences of educational advantages preceding the professional course.

3. Differences of excellence of the professional course taken by various men, due either to difference of equipment and ideals of schools at the same time or at different periods; i.e., Dr. A, who took his course in X school, and Dr. B, who took his course in Y school during the same years, may have pursued two markedly different curricula. Again, Dr. C, who took his course in Z school, ten years ago and Dr. D, who has just completed his course in Z school, have pursued very different curricula.

4. Differences in general educational outlook, due in part to different points of view as to the objects of the dental course.

5. Differences in what men get out of their professional course. Two men graduating from the same school in the same year may carry away very different quantities and qualities of training.

6. Differences in the proportional interest in school affairs and outside affairs, be these professional, intellectual, in lines other than dental, business, social or recreational.

7. Differences in industry and application to the teaching. Two men may devote an equal amount of time to teaching, but one may do it with lethargy, the other with energy.

8. Differences of nature of teaching experience. One man may have taught in several different subjects of the curriculum, giving a broader conception of teaching and a better appreciation of the correlation of the teaching of his subject with other subjects, while another man may have devoted the same number of years to teaching a single subject, giving him a firmer grasp on that subject, but narrowing his interest and appreciation of correlated subjects.

9. Differences in temperament; for example, one man may be a calm, con-

sistent and logical teacher while another is mercurial and haphazard, resulting in dissociated teaching.

10. Differences in judgment, both in general and educational matters. The chief factor which determines judgment is maturity, but intellectuality, training, scholarliness and many other factors participate in giving a man the asset of good judgment.

The foregoing are but a few of the characteristics that make or unmake a teacher. Many others will occur to each dental educator. Among these are graciousness; personal neatness and habits; command of logical expression in English; facility of demonstrating to students the method of doing things; ability to logically organize presentation of subject-matter; attitude toward students, etc.

Every executive officer of a dental faculty will say that all of the foregoing are truisms and perhaps inquire why they should be mentioned. In answer to this query it may be said that if a faculty organization is to be comprehensive, it is necessary first of all to analyze each teacher and to balance these analyses so that each teacher may be used most effectively. This is best done by taking advantage of the superior qualities of each man, since no single teacher can be expected to be such a paragon that he is superior in every one of these qualities which make a good teacher.

In no school can we escape the situation where we must use some men that are inferior, that are not as good as we wish. Even were a school unlimited in its expenditures, it is doubtful if it could procure a teaching staff composed entirely of superior men.

The efficient executive is the one who recognizes that he himself cannot do all the administration, and that he must delegate a large part of the details to others. Aside from the physical impossibility of all administrative work resting in one man, such a condition is extremely undesirable. The ever imminent possibility of sudden incapacity, sickness, or death makes the one-man plan of administration extremely precarious. In such a plan, the death of one man would leave the institution without a pilot and with no substitute who knows anything about handling the wheel. The school ship must therefore drift until another pilot can qualify. If the sea is calm, the school may come thru but if stormy, disaster is almost certain. Hence it is essential that every dean have one or more men who either individually or collectively can direct the school. The training of substitutes for administrative work can come only by their participation in that work under the general direction of their dean as a leader.

The efficient leader is the one who organizes the forces under his direction and so organizes as to get the best from each subordinate. The efficiency of any member of a teaching staff in such an organization depends on two principal factors: his capacity for the particular sort of work to which he is assigned, and his interest in that sort of work.

Organization of the teaching staff falls into somewhat diverse divisions, organization for instruction and organization for general administration. The second of these is, perhaps, best first discussed because it is the more general.

Organization for General Administration

This falls primarily into division of the several phases of the administration among standing committees and its consideration falls under several heads of which the following may indicate an analysis, namely, size of committees; personnel of committees; methods of choice of personnel; number of committees; and the field of each committee.

Size of Committees

A very astute political executive once expressed the opinion that the best committee consisted of three men of whom two are dead. While this witticism has some element of truth in it, on the whole

it leads to a dictatorship which is unhealthful. While necessarily the chairman of a committee has greater responsibility and must do more work than other members of a committee, yet care must be taken to avoid the habit of making the other members simply a rubber stamp to the chairman. Every member of a committee must share the work and responsibility, if democratic methods are to be preserved and efficiency secured. There is probably no better index of a committee's health and efficiency than occasional divisions in it.

Since committees must work largely at times outside of scheduled teaching hours, and since it is highly desirable that each committee meeting should have a full attendance of its members, small committees are better than large. A committee of three will work better than one of four or five, and five seems the maximum limit for any standing committee. This is, of course, exclusive of those ex officio members who may occasionally work with the committee.

Personnel of Committee

One of the most frequent mistakes in committee organization is to have the membership of all committees divided among a few members of the teaching staff. This inevitably leads to a small ring or clique controlling all details of a school, while the majority of the teaching staff are forced into the role of being simply hired employees. No man should be a member of more than two general standing committees nor chairman of more than one.

The personnel of any committee should be representative of the various interests of the teaching staff: A committee should not have all of its members from a single teaching department, nor should they all be the older men. Where committee membership is limited to full professors, there comes to be a sharp line of cleavage between them and subordinate grades. The younger men should be given the privilege of serving on committees and also should feel that such service is a part of the responsibilities connected with their membership on the teaching staff. Only by the policy of using younger men on committees can we prepare for the future efficiency of the school, a decade or more hence, when the men now of the more mature group are no longer available.

As a corollary to this, it is unwise to allow the membership of a committee to remain identical thru a long period of years. Such a policy leads to a static condition that is not progressive. An occasional replacement on a committee brings new ideas and better interest. The tendency is that when a man is efficient on a committee, he is left there for years, as a change means breaking in a new man; but in spite of this, it is desirable to occasionally replace part of the membership of each committee.

Selection of the Personnel of Committees

There are two methods of selecting the personnel of committees. One is by appointment by some executive officer, the other by election by the members of the teaching staff. The method of appointment, if the executive officer has carefully analyzed the qualities of his various subordinates, is likely to lead to greater initial efficiency of a committee. In such appointment, the executive officer can select men who will work well together, and also include in each committee one man destined for its chairman who will work smoothly with the dean. This method leads to greater smoothness of administration. Its danger is, however, great. There are differences of opinion, and properly so, in every teaching staff. The method of appointment is likely to get men largely of one line of thought and so to stagnate the progress of the school.

The method of election invites greater participation of all of the members of the teaching staff in the questions of general administration, and avoids the all

too dangerous fact and feeling that only a few men are in a position to exert any influence on general policies. Ultimately the elective scheme leads to better results, to better teamwork of all the teaching staff.

Such elections to committees should be for a definite term. Since it is undesirable to have a complete change of personnel in any committee at one time, the term for which a member is elected should be for more than one year, and the terms of some members, but not all, should expire each year.

There should be two restrictions to eligibility to a standing committee; one is, that if a man is already a member of two standing committees (or possibly one) he is ineligible to election to another standing committee; and another that after a man has served one or two terms on a committee, he is not eligible for re-election to that committee until a certain time (one year or one term) has elapsed. These two restrictions will prevent, first, one man from spreading his efforts over too many committees and he probably does none of them well; and, secondly, will assure occasional changes in the personnel of each committee and avoid too great power to one man in a single field of administrative activity. In the plan of appointed committees, since such are really deputies of the executive officer, that officer should appoint the chairman, but if committees are elected, each committee should elect its own chairman.

Number of Committees and Field of Each

There is, of course, a great difference of opinion as to the number of committees and their function. The fewer the committees the greater the field of each. The following may indicate the middle ground:

1. A committee on curriculum, schedule and catalogue. This committee will have charge of the division of time between the various subjects, the assignment of courses in years and semesters, their interrelations and sequence; the arrangement of the day and hour schedule, and the editing and publication of catalogues. Of course the field above outlined might be divided among three different committees or among two committees, the catalogue work being separated from that of curriculum and schedule.

2. A committee on entrance. The matter of entrance seems important enough to warrant a separate committee. The work of this committee will be to examine and pass on entrance credentials and to determine the fitness of applicants. The work of this committee might be restricted to entrance to the first-year class or it might also include advanced standing. This committee might be eliminated if its work is being done by the committee on students, but a separate committee on entrance will secure a better selection of students.

3. A committee on students. This committee will have charge of student discipline, the standing of students, warnings, probations, promotion from class to class, suspensions, deficiency in scholarship, and various other relations of the student to the course of study. Such a committee is well made up of five members, of whom the registrar is one. The other four should be men each in charge of a major course in each of the four years. Each of these four men should be made a class advisor to the students of the year of the curriculum which he represents. These class advisors will stand intermediate between the committee and the students and the student will communicate with the committee thru his class advisor. Such an organization distributes the burden of dealing with students and selects as advisor a man who knows each student personally and is in weekly contact with each student to whom he stands as advisor.

4. A committee on student activities. This committee will have control of elig-

ibility to atheletics, fraternity relations, student societies, student publications, glee club, and the various things over which the faculty exerts some control but assumes meager responsibilities.

5. Other committees will suggest themselves in various schools; for example—on library, on clinic, on building, on promotions of teachers, etc.

6. Occasionally a special committee will be required for some subject that arises as an emergency.

The committees should keep a record of their meetings and conclusions and decisions made, and these records should be kept at the school office where they may be consulted by any member of the voting faculty as occasion arises, and the chairman of each standing committee should, at intervals, report at faculty meetings any new precedents or policies adopted by the committee and give a summary of its general activities without going into the tedious exposition of the details of routine.

Since each committee is subordinate to the faculty as a whole, its actions are subject to confirmation by the faculty, and appeal may be made from it to the faculty.

Just how far the powers of the various committees should go is a matter which demands most careful adjustment. Whether changes in schedule and curriculum should be made without submitting them to faculty vote is a matter of local preference. Whether the committee on students should have power to expel students seems very doubtful. Giving committees too great power leads to bureaucratic methods which are almost as noisome as autocratic procedure.

One committee found in many schools has not been mentioned, and that is the executive committee. Such a committee may function to relieve faculty meetings of many tedious details and to promote promptness in dealing with the various routine matters that arise in the administering of the school. From that standpoint it is a good feature. On the other hand an executive committee, unless its powers are very sharply limited and its membership frequently changed, soon comes to assume such a self-sufficient attitude and such star-chamber methods, that it creates an oligarchy, which is the most hateful form of government. The members of such a committee soon come to exercise a power not at all commensurate with their positions as members of a faculty. The executive committee, while theoretically one of the most useful of administrative tools, is all too frequently practically the most dangerous to the well-being of a school, creating factions, unjust discriminations, personal jealousies and everything but hearty cooperation.

Organization of the Teaching

What has been said has chiefly to do with organization of the administration. We now come to a much more comprehensive problem and far more important.

The weakest point in teaching in most institutions is lack of correlation of the various courses. This is serious even in a preparatory school or college of arts but in professional schools of any kind a lack of correlation of courses is almost fatal to the ultimate object of the entire course of study, namely a well-balanced training.

The need and method of correlation has not been well appreciated in dental schools in the past. The adoption of a standard curriculum, altho not ideal, has brought about a reasonable balance in the amount of time given to the several subjects of the curriculum, but there has been in many schools a very dull appreciation of the logical educational sequence of the various subjects. Now that this has been pointed out we may hope for changes to better this condition. Nevertheless, when we have secured a proper balance of time among the various subjects, and a logical educational sequence in time of teaching these subjects, we shall yet fail to do our complete duty unless we find some method to

correlate the subject-matter in the various courses.

In teaching almost any subject we must fall far short of completeness. I know of no subject that can be completely taught except possibly the teaching of the alphabet to kindergarten children. Even the multiplication tables cannot be completely taught. We learn that table up to twelve times twelve, but there are an infinite number of combinations beyond that limit.

It being evident that in any subject of the dental curriculum we can teach only a small part of what is known of that subject, the question arises, how shall the parts to be taught be chosen? To answer this question for any subject requires great knowledge but greater wisdom. In the subjects of the dental curriculum this choice of what to teach in any subject must rest on two major premises; first, what has been taught in courses preparatory to the one in question; and secondly, what is to be taught in later courses for which the course in question is preparatory.

Followed to an ultimate conclusion, this means that every course is interwoven with every other course. Such a conception would be extremely restrictive, would deprive us of any elasticity in teaching and be lethal to initiative, but because we cannot go to the extreme in correlation is not an argument for avoiding any correlation.

There is in professional education a constant insistance that all teachers in a professional school should be graduates in that profession, the usual reason being put forward that such a teacher will know what his students have had and what they will get in later courses. This argument seems to me to be fallacious. Because a teacher graduated in his own or some other school five, ten or twenty years ago, is no assurance that he knows or appreciates what is taught in his own school today. This is especially true in dental schools where the teaching has been greatly expanded and improved in recent years. It goes without saying that the teacher must know his own subject. Having this, I believe a teacher with pedagogical sense without the professional degree is preferable to one with the degree and lacking the pedagogical sense. Indeed the degree is often a detriment because its holder, having taken the professional course—possibly many years ago—thinks he knows what is being taught today, while the non-professional man knowing his limitations, seeks to inform himself as to what is being taught in his school at the present time in those subjects to which his subject is more closely related.

What is meant by pedagogical sense? To my mind it means an appreciation that each teacher is a single wheel in a large machine, and that he must mesh accurately with the gear which transmits the power to him and also accurately with the gear to which he transmits the power—that is the training of the student of subsequent courses. Failing to do this the efficiency of the whole gear system is lessened and the coefficient of power in relation to energy put into the machine is much less than it should and might be.

When a teacher devotes a disproportionate amount of time to some single phase of a subject, either because he is especially interested in it or because his judgment has been warped by limitation of his study, we get what may be compared to an oversized tooth in the gear. This, I believe, is an explanation of the familiar fact that men prominent in research are very frequently unsatisfactory teachers.

Pedagogical sense means that a teacher must take the product as it comes to him and teach from that basis. He should not rail against the poor preparation of the student and fail large numbers of students because they are not prepared as he wants them. He should ascertain what has been taught in previous courses and hold the students for that but not for things which have not been taught. Likewise he should ascertain what of his

own subject the student will be expected to know when he goes to higher courses. He must teach to the average standard of intellectuality and ability of his class. If this standard is below what a teacher believes it should be the point of attack is the administration of the admission of students to a school or of teaching the earlier courses of the curriculum. To abuse a class or individual students and call them numskulls, asses, morons, etc., as some teachers do, shows not only lack of ability as a teacher, but a serious deficiency of common sense. When a school takes the responsibility of admitting a student it owes him decent treatment and he should not be allowed to be abused, ridiculed or humiliated by his teacher.

When a teacher is found to be failing large numbers of his students, it is the ability of the teacher that should be investigated rather than that of the students.

If a teacher cannot teach his subject so that at least 80 per cent of his students can pass his examination it seems good evidence of poor exposition by the teacher or bad judgment in setting examinations. Usually the two go together, and are frequently found in young teachers, who get the absurd idea that failure of large numbers of students is prima facie evidence of high grade of ability in the teacher.

The frailty of human initiative and judgment is such that it is beyond hope to have every teacher possessed of this pedagogical sense to a degree where he will voluntarily correlate his course with other courses. We must find some way to bring this about and to be assured that it is effective. One way is to prepare a syllabus of every course and give to every teacher a copy. But exigencies arise during the progress of every course that necessitate unforeseen changes so that the syllabus plan is not wholly desirable, and furthermore, unfortunately, many teachers will ignore the content of a syllabus in the course someone else is teaching.

Another plan is to have frequent meetings of the entire teaching staff at which all of the work is discussed. Obviously this is very time-consuming and takes the time of men whose subjects are very remote; for example, a discussion of the work in chemistry does not intimately interest the man teaching ethics.

A better plan is to organize the teaching into divisions. This is different from departments. A department is usually very circumscribed. A division would include several of these units ordinarily called departments. This plan has been inaugurated by the organization of the course of study by the Dental Educational Council. The number of divisions in a dental school is a matter of differences of opinion. I believe it should be not less than five nor more than ten.

The division should include those subjects that are closely correlated. Obviously operative dentistry is one including dental anatomy and operative technic. Prosthetic dentistry is another and probably with it should go crown and bridge and orthodontia. Biology, anatomy, histology and embryology constitute another. Each school will work out its own ideas as to what subjects go into each division. Some borderline subjects might well belong to two divisions, e.g., dental anatomy to anatomy and also to operative dentistry; therapeutics to pathology and also to operative dentistry.

Having established the divisions, a chairman should be chosen. Such choice can be either by appointment by the dean, election by the faculty, or election by all the teachers in a division. It would be in some ways a good idea to change the chairman at intervals of one or two years.

Now comes the real value of such an organization, and that is in meetings of the division. Every teacher from professor to the newest demonstrator, including student assistants, should be made to

feel that it is a highly important part of his duties to attend the meetings of his division and take part in discussions. A record of attendance should be kept and the teacher who habitually fails to attend should be considered a less desirable teacher and less entitled to promotion than his colleague who does attend.

The older men should not monopolize the discussion. The younger teacher, more recently a student, has a better appreciation of the student viewpoint, and consequently makes suggestions of great value. His opinion on disputed points is not to be disregarded. Moreover, such meetings are training schools for the men who in a few years must take the burden of teaching from the shoulders of the older men and they must be given a chance to express their views and argue their standpoints.

The subjects for discussion in such meetings are self-evident. They include the relation of the subjects of one division to those of other divisions; the content and methods of courses as now running; what omissions should be supplied; what superfluities can be omitted; the ability of individual students; and a multitude of ancillary subjects that will suggest themselves to every experienced teacher.

The frequency of divisional meetings will vary with the divisions. They should be frequent enough to keep up interest and perhaps each meeting can include one primary subject started by a prepared discussion by some one teacher. Such meetings should be not less often than bimonthly and may be even biweekly.

An organization on this basis will bring about an improvement in the teaching in any school. It will revive the lagging interest of some teachers, curb the idiosyncrasies of others, eliminate jangling between colleagues, and give more accurate ideas of the ability of individual teachers.

The chairmen of the several divisions might well be organized into a committee on instruction, to take over part of the function of the standing committee on curriculum, schedule and catalogue or even to constitute that committee.

This plan is not an innovation entirely. It is feebly followed in some dental schools in respect to some subjects. In certain respects it has long been in use in the public-school systems in large cities. Such a plan will enable our dental schools to minimize the waste of time and effort on the part of both teachers and students. It will avoid the omission of important parts of the training that lie on the borderland of two subjects or courses and which each instructor thinks the other man is giving. It will also avoid useless repetition of the same subject-matter in two courses. In a word it will provide for an even, steady flow of teaching instead of the disconnected jerks that now characterize the teaching of many a subject. It will promote efficiency and a proper return for effort expended. It is the difference between individual endeavor often at cross-purposes, and teamwork, and means real educational organization.

May we hope that our dental schools will try such an organization and that out of the experience gained in different schools we may in the future improve the pedagogue of dental teaching in all the schools? An increase of 5 per cent in efficiency in every dental school would mark a wonderful advance in the dentistry of the next generation. I believe that such organization will mean not a 5 per cent advance, but a 25 per cent increase in the excellence of preparation that we can give our students.

THE OCCURRENCE, DIFFERENTIAL DIAGNOSIS, AND TREATMENT OF TUBERCULOSIS AND SYPHILIS OF THE MOUTH, AND ACUTE ULCEROUS GINGIVITIS

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TWO of the most widely distributed diseases of the human race are tuberculosis and syphilis; their high morbidity and high mortality make them headliners on the programs of all public health and welfare organizations. Not only is this true, but the mouth lesions, especially of syphilis, are of consequence to the dentist; he very frequently sees them first, and therefore the ability even to approximate a diagnosis is of value not only to the individual in the chair, but also to the dentist himself and his other patrons. Exposure to syphilis is one of the necessary risks of the dental profession, and the conveyance of syphilis by means of dental instruments has happened too frequently in the past, and these facts cannot be overemphasized. On the other hand some recent discussions of mouth tuberculosis, semi-popular in character and in dental magazines, are so full of glaring misstatements both as to the prevalence of such disease and also as to the danger of secondary infection from it as to require some correction. For these reasons a rather popular discussion of both syphilis and tuberculosis does not seem out of place now. To this matter is added a few words concerning the fusiform bacillus infection of the mouth, because of certain relationships which exist between it and the luetic infection.

Mikulicz[1] says "that the disposition of the mouth mucous membrane to tuberculosis cannot be considered of any great moment. Altho in tuberculous individuals certainly no fewer bacteria pass over the mouth mucous membrane than over that of the larynx or air passages, certainly the former are attacked much more rarely; and primary tuberculosis of the mouth mucous membrane must be considered a rarity." E. P. Zeisler[2] quotes a clinician as stating that in 20,000 cases of tuberculosis examined by him, no tuberculosis disease of the lips had been seen. T. L. Gilmer[3] says: "I have seen but three cases of tuberculosis of the mouth, one of the tongue, and one of the sublingual salivary gland, and one an extensive involvement, including a part of the lips, the mucosa of the cheek, the soft palate, the tongue, and a portion of the pharynx." These opinions represent the best of the authorities both here and abroad and coincide with my own belief that mouth tuberculosis is very infrequent and the chance of meeting it in general practice very remote. On the other hand a number of

[1]Mikulicz and Kummel, *Diseases of the Mouth*, (3d ed.; Jena, 1912), p. 117.

[2]*Archives of Dermatology and Syphilis* (1921), III, 14.

[3]*Dental Review*, June, 1919.

continental authorities, Westenhoeffer, Zilz and others[4] stress the importance of carious teeth as portals of entrance for tuberculosis and suggest that many of the carious teeth of children contain tuberculous lesions, opinions that are not yet generally accepted as true.

Tuberculosis of the mouth is usually divided into such groups as the following: (1) primary ulcerative tuberculosis of the mouth mucous membrane; (2) lupus (tuberculosis of the epithelium) of the mouth mucous membrane, usually secondary to lupus of the face; (3) tuberculous rhagades, infiltrates, and ulcerations of the tongue; (4) isolated tuberculous ulcers of the soft palate; (5) acute miliary and disseminated tuberculosis of the mouth in advanced pulmonary phthysis.

The diagnosis of lupus is essentially like that of the skin, and since primary lupus of the mouth is very rare and the mouth lesions usually secondary to a similar condition of the face, its identification does not present any difficulties. In the comparatively rare primary condition, on the contrary, its recognition may not be easy. It usually arises simultaneously in many more or less widely separated regions, such as the vermilion border of the lips, or the soft palate, and runs a very chronic course essentially similar to lupus of the skin.

Tuberculous ulcerations must be distinguished from syphilis, epithelioma, other infections, and injuries. The diagnosis depends on the following points: (1) clinical appearance and characteristics, such as the presence of typical miliary tubercles in the floor or the border of the ulcer; (2) absence of the board-like induration as found in syphilis; (3) negative spirochete and positive tubercle vacillus examination; (4) histological examination, with the presence of typical tubercles, and the presence of acid-fast bacilli; (5) enlargements of the regional lymph glands less noteworthy than in syphilis.

The comparatively benign tuberculous infiltrates and rhagades of the tongue occasionally resemble malignant tumors because of their firmness and the tendency to infiltrate. It is only after their removal or ulceration that their true character becomes clear. It should be borne in mind that tuberculosis may be present in either a chronic or an acute form, it may be ulcerative and destructive, or hypertrophic and comparatively benign. The chronic forms are torpid, atypical, not painful, and resemble epitheliomas or gummas. On the other hand the acute type is very painful, the progress of the ulceration extremely rapid (three to eight days) and the outlook very bad, as it is usually a phase of a generalized miliary tuberculosis.

The treatment of tuberculous mouth conditions is merely a part of the general treatment of the disease: (1) unusual pains in the care of the teeth to prevent irritation, injury, or any mechanical insults to the mouth mucous membrane; (2) general management of tuberculosis (rest, air, and sunshine); (3) high protein diet; (4) cod liver oil internally; (5) cocaine ointment for pain; (6) diluted hydrogen peroxide for a mouth wash; (7) filtered Coolidge treatment (X-ray department).

Many of the best discussions of mouth tuberculosis are found in the journals of the dermatologists, and it is to them that the interested dentist is referred for additional information. It can be seen from the foregoing that mouth tuberculosis will be found in the practice of the dentist but rarely, if at all, unless he happens to practice in a sanatorium or in a community frequented by those taking the cure for tuberculosis.

There is a statement that to study medicine is to study syphilis. Certainly no field of dentistry, medicine, or sur-

[4]Misch, *Textbook of the Border Subjects of Medicine and Dentistry* (Stuttgart, 1914), pp. 254-73.

gery is without contact with the problem of syphilis. Even the dentist has his important part to play in the projected eradication of syphilis. Nowhere else in the body than in the mouth are the signs of syphilis more evident to the sophisticated practitioner in all of the stages of the disease. It should be recalled that syphilis is a generalized infection of the body by way of the blood and lymph channels, beginning as a sore or ulcer (chancre) somewhere on the skin or on mucous surfaces. The penetration of the specific spirochete (the *Spirochaeta pallida,* the germ of syphilis) into the blood stream is not immediate and is apparently by way of the lymph channels, so that it is only at the end of five to eight weeks, or longer, that the general invasion (secondary syphilis) of the blood stream occurs. This period is characterized by the general eruption, the mucous patches of the mouth mucous membrane, and systemic disturbances. With the disappearance of the spirochetes from the general circulation the disease may persist for a long time, even for the life of the host, in one or more organs, especially in the lymphatic vessels adjacent to the smaller blood vessels.

The primary lesion may and frequently does occur in the mouth. J. V. Klauder[5] supplies a table compiled from the data accumulated by Bulkley, Munchheimer, and Scheuer as to the location of the extra-genital primary lesions. It is sufficient to note that the lips, the tonsils, and the tongue are the most frequent locations of the mouth chancres.

The diagnosis of primary mouth syphilis presents some difficulties, especially that of the gums and the tonsils. It depends upon the following clinical considerations: (1) appearance of the lesion, i.e., having an elevated round top with shiny or crusted surface; (2) markedly indurated base; (3) noteworthy regional adenopathy; (4) painlessness; (5) typical history of slight mucous membrane abrasion or defect, induration, and later lymph gland involvement, after possible exposure (usually difficult to get such an admission).

The actual steps in arriving at the diagnosis are approximately as follows: (1) the clinical history of exposure (if obtainable); (2) typical appearance of the lesion; (3) characteristic regional adenopathy; (4) result of the examination of the smears from the ulcer by dark field illumination (see following discussion for explanation of this procedure); (5) result of the examination made from the material obtained from regional gland puncture by dark field illumination; (6) result of the therapeutic test; (7) much later, result of the Wassermann blood serum test; (8) rarely, histological examination, so-called biopsy.

The application of the demonstration of the specific spirochete in smears made from the initial lesion and examined by dark field illumination offers some difficulties. On this account it should not be attempted except by an expert at this sort of examination, for in the mouth, especially in the ulcerative type of chancre, there is a possibility of contamination with the mouth spirochetes. The Wassermann test does not usually become positive soon enough to be of any help in the diagnosis of the primary lesion; the foundation, therefore, for a diagnosis, and an early one is of the greatest importance for the patient's own good, depends largely on the clinical appearance, the history, and the results of the various dark field illumination examinations.

Chancre of the mouth must be differentiated from the following: tuberculosis, epithelioma (carcinoma), tertiary lues, epulis or other tumors of the gums, sarcoma, fibroma, acute infections of the lips or gums. Secondary syphilis of the mouth is of the utmost importance in the clinical recognition of this disease, espe-

[5] *Archives of Dermat. and Syph.,* (1921), III, 615.

cially in individuals where the primary defect is not disclosed. It appears simultaneously with the eruption on the outside of the body, beginning with small and large erythematous spots and becoming large, confluent patches on the soft palate, sharply outlined and painless; indeed the patient is entirely unconscious of their presence. The typical mucous patch arises from a previously unaltered mucous membrane; it is sharply outlined, and slightly elevated; the covering is gray-white, due to a thickening and swelling of the epithelium, and is loose or spongy with a narrow hyperemic border. This pearly-gray, velvetlike, frosted surface is so characteristic in the typical mucous patch that it cannot be mistaken. Later in its evolution the mucous patch is not so typical, especially in the last stages with mixed infection, or in degenerate forms when it may be confused with such other conditions, as diphtheria, leucoplakia buccalis, stomatitis aphthosa, herpes buccalis, erythema exsudativum bullosum, drug rashes, pemphigus, especially vegetans, mercurial stomatitis, decubital ulcer.

The lesion of third stage syphilis is usually spoken of as gumma, and this form is frequent in the mouth. Especially in the lips and the tongue this may assume either a circumscribed or a diffuse form, while the lesion in the region of the palate frequently breaks down and this necrosis produces a typical perforation of the palate. The diagnosis of gumma may be confused with carcinoma, sarcoma, certain forms of tuberculosis, Vincent's angina (throat and tonsils), such infectious diseases as scarlet fever, decubital ulcer, leucoplakia.

The diagnosis of gumma or third stage syphilis depends on a very careful analysis of the clinical conditions in addition to the information supplied by the usual laboratory examinations. All of the various possibilities must be considered, such as the origin of a malignant growth in the scar or site of a healed or healing syphilitic lesion; a tertiary syphilis may be mistaken for a malignant growth on the return of a single negative Wassermann test and the patient compelled to submit to a mutilating, unnecessary operation.

It seems proper at this time to consider the application of the various possible laboratory tests for syphilis. They are: the dark field illumination of smears from the suspected lesion or regional glands; skin tests with luetic suspensions similar to the tuberculin tests; the Wassermann or complement deviation test; the various flocculation of precipitation tests, such as the Sachs-Georgi; tissue examination, so-called biopsy.

The dark field illumination examination of smears is of the greatest value in the study of the suspected primary lesion. By it the diagnosis may be arrived at in the first weeks of the infection and early treatment instituted with the object in view of preventing any secondary syphilis and the entrance of the spirochetes into the circulation. Its limitations are: failure to get suitable smears, confusion in the mouth of the *Spirochaeta pallida* with the mouth spirochetes, and its failure in tertiary syphilis to be of any aid to diagnosis.

The Wassermann reaction is a complicated test, non-specific in character, due to some alteration possibly of the lipoid content of the blood serum and spinal fluid; in other words changes of a biochemical nature of fatlike substances in the body fluids. There are necessary for the making of such a test five reagents, the activity of four of which must be carefully standardized and fully known. They are: (1) sheep's blood corpuscle suspension; (2) heated blood serum of a rabbit which has been repeatedly injected with sheep corpuscle suspensions; (3) unheated guinea-pig serum; (4) alcoholic extract of heart, liver or equivalent; (5) patient's serum. The first three when brought together in proper proportions result in the solution of

the sheep's corpuscles, that is, the blood pigment is dissolved completely so that the suspension becomes a clear lilac-colored solution, and the corpuscles disappear completely, grossly. If, however, the guinea-pig serum, the heart extract, and the patient's serum are brought together for a certain time under uniform conditions, and the serum used is that of a syphilitic, the active ingredient of the guinea-pig serum is used up or bound to the fatty substances of the other reagents and can no longer play its part in dissolving out the coloring matter of the sheep's corpuscles, which therefore remain intact and the suspension unchanged when sheep's corpuscles and rabbit serum are added; the corpuscles settle to the bottom leaving the suspending fluid clear and colorless.

This brief explanation of the Wassermann test is not given for the purpose of instruction, but simply to emphasize the cumbersome and complicated nature of the changes involved. That is its first fault. Its second weakness lies in the fact that the serum of an individual suffering with beginning syphilis does not become positive until six or more valuable weeks (from the standpoint of treatment) have gone by. In the third place, it is not specific, and even in the best of hands there are certain variations in its interpretation. Most of these are in cases of syphilis which yield a negative Wassermann, but there is a smaller proportion in which other conditions may give a positive test. Yet with all its faults the Wassermann test is the best laboratory test now at hand for the diagnosis of syphilis; its limitations must always be held clearly in mind. The following conditions of the patient are known to effect the outcome of this test: (1) ingestion of even small amounts of alcohol within twenty-four hours before the withdrawal of the blood used for the test may produce a false negative; (2) fever may cause a false positive (as pneumonia); (3) yaws, malaria, relapsing fever, trypanosomiasis, and fusiform bacillus infections sometimes give false positive tests; (4) during treatment negative reactions may occur which are not permanent; (5) pulmonary tuberculosis may give a false positive; (6) ether or chloroform narcosis may produce a false positive test; (7) leucemia and other blood diseases may yield positive reactions. Variations in the method of collecting the blood from the patient for the test may disturb the final result, as: failure to use clean, dry, sterile containers, failure to separate the serum from the blood clot within twenty-four hours after withdrawal of the blood from the patient, failure to store the serums and blood in an ice-box, or undue delay in the performance of the test.

The clinician should also know that variations in the technic of performing the test may also produce variations in the end result, depending on such factors as the kind of reagents used, the temperature, and the time of the incubations. All told, therefore, the correlation between the laboratory interpretation of the test and the actual clinical condition which does exist in the patient is perhaps between 80 and 85 per cent of the cases tested; most of the failures of agreement lie in the direction of false negative Wassermann reactions.

The luetin or skin test has two of the same faults as the Wassermann test, namely, it does not act in early syphilis, and its ratio of false negatives is even higher than that of the serum test. On these accounts it has never come into common use.

During the war because of inability to get the necessary reagents in the Central Empires to perform the classical Wassermann test, a precipitin reaction was evolved for testing the serums of suspected syphilitics, which, at least, has the merit of simplicity. Levinson and Petersen[6] describe the Sachs-Georgi modification of this precipitation test in the

[6] *Archives of Dermat. and Syph.* (1921), III, 286.

following steps: (1) absolutely clear centrifuged blood serum or spinal fluid of the patient to be tested is taken; (2) this serum is diluted and added to diluted alcoholic extract of beef heart and incubated between eighteen and twenty-four hours; (3) the amount of flocculation or precipitation is read off with a hand lens at this time; (4) the tubes are now allowed to stand another twenty-four hours, this time at room temperature, and a second, final reading is made at the end of this time. These authors conclude from their parallel tests of 1,042 human serums and spinal fluids by both this test and the Wassermann that "because of its simplicity, and the fact that it is frequently positive in cases where the Wassermann test is negative, we are of the opinion that the Sachs-Georgi reaction offers a valuable aid in the routine examination for syphilis when used in connection with the Wassermann test." On the other hand Kilduffe[7] concludes: "A diagnosis of syphilis or a conclusion as to treatment cannot be based on the results of a Sachs-Georgi reaction with safety, and the reaction is not suitable for general use for this purpose." It is sufficient to say that this test has not yet been accepted as of value by clinical laboratories.

However much the diagnosis of syphilis may be a matter of concern for the dentist, the treatment is only an item of academic interest, for that belongs to either the syphiloligist, or to the internist. It is marked by various elaborations due to the addition of salvarsan, neosalvarsan, and silver-salvarsan to the resources of the therapeutist. It is not correct to say that they have replaced mercury and the iodides, but they have very greatly supplemented the latter, even to becoming the backbone of the treatment. All three are arsenic preparations of an organic nature, neosalvarsan somewhat less toxic than salvarsan and silver-salvarsan. The last named is an organic preparation containing approximately 22.5 per cent arsenic and 14 per cent silver. In animals silver-salvarsan seems to be twice as effective as old salvarsan and three times as effective as neosalvarsan, so that 0.25 gram of silver-salvarsan is said to be the equivalent of 0.4 gram of old salvarsan and its use is apparently attended with more danger when given in the same-sized doses.

Major Walson[8] of the United States Army has used silver-salvarsan in six thousand injections and recommends a standard treatment consisting of four courses of silver-salvarsan and grey mercurial oil. Each course consists of seven injections at seven-day intervals, and thirty days between courses. Hoffman[9] believes, on the contrary, that one course of the silver-salvarsan treatment will cure early syphilis. It must be remembered that the silver-salvarsan treatment is still experimental and that neosalvarsan used with mercury is still the method of choice; and this in spite of the fact that the former seems to present a real therapeutic advance.

Acute ulcerous gingivitis has certain resemblances to syphilis, most of which have already been mentioned in the previous pages. Grieves[10] prefers to call it ulcero-membranous gingivitis, Stillman[11] phagedenic gingivitis, and others trench mouth or Vincent's stomatitis. Gilmer[12] in 1909 described and named this disease, calling it acute ulcerous gingivitis; Tunnicliff[13] was able to cultivate the fusiform bacillus from Gilmer's cases. She also found a spirochete constantly in

[7] *Archives of Dermat. and Syph.*, 1921, III, 416.

[8] *Amer. Jour. Med. Sci.* (1921), 161: 418.

[9] Editorial, *Jour. Lab. and Clin. Med.* (1921), 6: 529.

[10] *Dental Cosmos*, September, 1918.

[11] *Dental Cosmos* (1921), 63: 471.

[12] *Dental Review*, June, 1909.

[13] Tunnicliff, and Weaver and Tunnicliff, *Jour. Amer. Med. Assoc.* (1906), 46: 481; *Jour. Infect. Dis.* (1906), 3: 148; (1905), 2: 466; and (1914), 8: 316.

association with the fusiform bacillus and believed both to be different forms of the same organisms. Others consider them separate forms of bacteria living in a symbiotic relationship. The treatment proposed at this time consisted in irrigation with dilute hydrogen peroxide, painting with compound tincture of benzoin, and mercurous chloride internally.

During the world-war, first in the trenches and later at home, this disease became widespread and as a result considerable literature concerning it has grown up in both the dental and medical magazines. However the original description of Gilmer seems worthy of repetition without change:

> It attacks simultaneously the gum margins on their buccal or labial aspect about two, three, or possibly four teeth only, at the same time. These ulcers seemingly come suddenly, quickly destroying the gingivae down to the alveolar process, but seemingly not invading it, baring the roots of the teeth to this extent. The margins of the ulcers are everted, crater-like, somewhat similar to chancrous ulcers. The base of the ulcers are overlaid with grayish white covering. When this covering is removed the granulating surface bleeds freely. The lymphatics related to area become enlarged, and, unlike chancrous lymphatic enlargements, are tender. It is also unlike chancre in that the ulcers are exceedingly painful to touch. Salivation is much increased, the breath is fetid and, owing to the absorption of the toxic elements, there is a rise in temperature. The contiguous lingual gingivae become reddened, but do not participate in the ulceration. The condition has been mistaken for syphilis.

The diagnosis is based on the clinical appearance, the sudden onset, with a preceding period of anxiety or sleeplessness, the painful, sensitive, foul-smelling gingival ulcers which bleed easily, and the finding of the fusiform bacillus associated with the characteristic spirochete in the smears made from the diseased places. Cultivation of this organism is not difficult if performed under aerobic conditions on blood agar or blood serum. This growth only in the absence of oxygen has assisted clinicians largely in the selection of drugs for use as mouth washes in this infection.

The relationship of this disease to syphilis is suggested by the presence of a spirochete in the smears and cultures, and also by the frequent presence of a positive blood serum Wassermann test. These relationships have suggested the use of arsenic preparations in the treatment of acute ulcerous gingivitis.

Stillman's[14] treatment is based on the aerobic growth of the fusiform bacillus as a foundation, namely the use of a cleansing mouth wash supplying an excess of oxygen to the infected gingivae, and so inhibiting the growth of the bacteria. This mouth wash consists of a teaspoonful (one drachm) of sodium perborate in a half-glass of tepid water; local applications of a solution of iodin and silver nitrate; and such instrumentation as can be accomplished without injury to the gingivae.

Ganley[15] proposes a classification of the disease into four types based largely upon the severity and extent of the disease as well as the mouth condition previous to infection. His treatment depends upon the classification but essentially is 7 per cent chromic acid applications followed by compound tincture of benzoin early in the disease. On about the third or fourth day the chromic acid is replaced by 2 per cent copper sulphate solution. He occasionally uses 15 per cent argyrol as a local application and general prophylaxis when it can be done without injury to the inflamed gingivae.

The arsenical treatment originated largely on the continent first with Fowler's solution, later salvarsan, neosalvarsan, and quite recently silver-salvarsan. A suitable salvarsan local application consists of twelve grains of salvarsan in half an ounce of glycerin; silver-salvarsan may be used instead of the salvarsan. The intravenous administration of the

[14]Stillman, *loc. cit.*

[15]*Boston Med. and Surg. Jour.* (1920), 183: 466.

salvarsan preparations has been recommended, but there is no justification for such a procedure. The infection is purely a local one, and the mortality almost none. The systemic effects are due wholly to the absorption of toxic material thru the mouth mucous membrane and thru the gastro-intestinal tract. The arsenic is needed only in the mouth and there is as concentrated a form as is possible. Intravenous administration is a prolonged way of getting the arsenic to the mouth in a very dilute form; furthermore there is a distinct risk to the life of the patient attached to the intravenous administration of the arsenic preparations, and the death-rate tho low, as in anesthesia, is nevertheless positive. Such a death in the treatment of acute ulcerous gingivitis is without any mitigating circumstances.

In this discussion an effort has been made to emphasize the importance of the part played by the clinician in arriving at a diagnosis, without minimizing the functions of the laboratory. Diagnosis requires the aid of the laboratory but only as a useful and necessary tool, and cannot function effectively unless the final judgment, the last word is pronounced by the clinician. It is amlost axiomatic that, the diagnosis once made, treatment is a matter of routine which is not usually difficult of attainment.

Discussion

Herbert A. Potts, Chicago, Illinois: Careful attention to Dr. Hatton's remarks will teach us the importance of developing diagnostic or living pathology, the clinical picture of getting all the history and really making a diagnosis before bringing in the laboratory findings. As. Dr. Hatton said, there are many avenues by means of which mistakes in a Wassermann report may be made. We are too prone to take the report of the laboratory as a basis in the record of a particular case. We must make the diagnosis and then check up our clinical diagnosis by the laboratory. That may be illustrated by a double infection which was present in a case I saw not very long ago. It was a lesion on the lip. The dark field illumination showed the organisms of syphilis and we began rigid antisyphilitic treatment; the lip lesion improved slightly. We gave numerous salvarsans and numerous rubs but still the patient was not getting well. Finally the idea of malignancy developed and it proved to be a malignant growth. It was removed but the patient died two years later of general sarcomatosis, thus we find that the report of the laboratory was not absolutely correct. There was no doubt but that man had syphilis and there was no doubt also that he had a malignant disease. We must therefore check up on these things.

Dr. Hatton (closing): Regarding the term angina, I prefer as a name for the fusiform bacillus infection the term which Dr. Gilmer first introduced into the literature, acute ulcerous gingivitis—and in my paper that was the only name I used to refer to the infection of the gums. I did use the term Vincent's angina but in the same sense as Dr. Blum used the phrase.

In describing the treatment of syphilis I said it was only a matter of remote interest to the dentist, meaning that the dentist should not attempt to treat it.

IS A PULPLESS TOOTH A DEAD TOOTH?

By RUSSELL W. BUNTING, D.D.S., Ann Arbor, Michigan

(Read before the Michigan State Dental Society, Detroit, Michigan, April 11-15, 1921)

IN THE recent all-absorbing interest which has been centered in or about the pulpless tooth, considerable diversity of opinion has arisen regarding the exact status of such teeth and the terms by which they should be known. The term "dead teeth," denoting teeth in which the pulps have been devitalized or removed, has by common usage become so firmly intrenched in dental phraseology that we have accepted it without question. But upon examination it appears that the term "dead" also carries with it the idea that the thing which is dead is *ipse facto* a foreign body and therefore should be removed. To this meaning of the term, the 100 per cent vitalists on the one hand heartily subscribe, while on the other hand certain of the ultra-conservatives take the opposite view and believe that the dental tissues may continue to be nourished after the death of the pulp from the peridental tissues thru the cementum. The later group cite the recent work of Harold Box, who has found that protoplasmic fibers run continuously from the membrane on the outside of the tooth, thru the cementum, to the dentinal tubuli within, and claim that thru these channels the dentin and enamel are kept alive long after the death of the pulp.

Out of respect to this controversy, which is as yet far from definite settlement, many writers give comfort to both sides by studiously avoiding the term "dead teeth" and substituting for it "devitalized teeth." But the latter term is no better than the former for they are synonymous in every sense and the preference of either is a distinction without a difference. As an editorial in the *Journal of the National Dental Association* (May, 1920) points out, both terms are unfortunate and their use has served to confuse the mind of the laity as well as that of the medical and dental professions.

Before a definite answer to this question may be arrived at, it must be determined just what changes take place in the tooth after the death of the pulp. Do all the dental tissues die? If so, does the tooth cease to bear a physiologic relationship to the surrounding tissues and become a foreign body? An opinion on this subject should not be based on empirical or categorical statements but should be arrived at from a careful consideration of the origin and histological structure of the dental tissues, their normal sources of nutrition and physiological characteristics, and the clinical facts which have been gathered. In our discussion of this problem, it is not possible to fully review all of the dental tissues in this manner but it is our purpose to state certain of the more outstanding characteristics which have a direct bearing on the discussion.

The enamel is developed from epithelial tissue. During the process of its formation, the cells which build the enamel receive their nourishment from the surrounding connective tissues. A very rich plexus of blood vessels in close

contact with the enameloblasts bring to them the necessary materials for building enamel. When the enamel is completed, the blood vessels together with the enamel forming cells undergo atrophy and, during the process of eruption of the tooth, become permanently separated from the enamel which they have formed. The mature enamel is therefore completely deprived of its formative organ and its original source of nutrition. The enamel is a non-cellular inorganic structure in which it does not appear that true metabolism takes place. However, it is well known that enamel undergoes changes in color, hardness, and other physical characteristics during the life of the individual and that the greatest change takes place after the death of the pulp. We have shown[1] that fluids may pass thru the enamel in either direction as the result of osmotic pressures set up by the blood on the inside of the tooth and the saliva on the outside. We have also shown that the character of the enamel is related to the character of the blood in the pulp chamber and to the composition of saliva in which the tooth is bathed. When the pulp dies, the enamel is effectually cut off from the osmotic interchange between blood and salivary fluids and is dependent solely on the diffusion of salivary fluids, which process apparently does not adequately maintain the normal characteristics of that structure. It may be said, therefore, that altho the fully formed enamel does not undergo metabolism similar to cellular tissues, its physical characteristics are largely presided over and determined by the living pulp and that after death of the pulp, the enamel loses whatever vital characteristics it may possess.

The dentin arises from mesoblastic tissue and its formative organ, the pulp, remains in physiologic contact thruout life or until the death of the pulp. The mature dentin, unlike the enamel, possesses a permanent source of nutrition thru the blood circulation of the pulp and, by virtue of cellular prolongations of the odontoblasts into the substance of the dentin, active metabolic changes take place in this tissue during the life-history of the tooth. The pulp therefore, when in health, unquestionably exercises nutritive and formative functions toward the dentin which are completely suspended at the death of that organ. The question then arises as to whether or not the dentin may receive nourishment from some source other than the pulp after the death of that organ. Many attempts have been made to establish a connection between the circulatory system in the peridental membrane and the dentinal fibrillae. Experimentally stains have been forced into the tooth under pressure, both by way of the pulp canal outward and from the outside of the root inward. Stains have also been introduced by intravitam injection and in all cases the stain has been traced in its course from the pulp canal to the dentocemental junction or from the peridental membrane to the deeper layers of the cementum, but it does not cross the boundary between the dentin and cementum, except in the apical portion of the root. Harold Box and others have demonstrated an apparent communication between the peridental and dentinal fibers in the apical region of the tooth, but in the middle and cervical thirds of the root, no such connection is evident. In our osmotic experiments, we found that, altho fluids might be forced thru the dentin and enamel by osmotic pressure, sections of the dentin and cementum taken from the middle or cervical portions of the root were entirely impervious to such action. It seems evident therefore that an impenetrable barrier exists between the dentin and cementum except at the extreme tip of the root and that this barrier is only crossed by the occasional entrance of an accessory foramen which communicates directly with the

[1] *Jour. Nat. Dental Assoc.*, May, 1918, p. 519.

pulp canal. From histological data, it does not then appear that the dentin may receive any appreciable amount of nourishment after the death of the pulp. Clinically, it is observed that the dentin undergoes definite retrograde changes subsequent to the death of the pulp. The most notable of these are changes in color, decrease in resistance to strain, and weakening of the attachment of the enamel. Apparently it is dead inorganic substance, incapable of any vital activity.

The cementum, like the enamel, is developed from without the tooth. The condensation of connective tissues about the developing tooth known as the follicular wall lays down one, two, three, or more layers of dense bone on the surface of the formed root and into this structure, there are imbedded the ends of strong connective tissue fibers which attach the tooth to the surrounding alveolar wall. The formative organ of the cementum is ultimately converted into a permanent structure, the peridental membrane, which serves to continuously nourish the cementum and acts as the medium by which the tooth is maintained in physiologic function with the surrounding tissues. As long, therefore, as the peridental membrane remains in health, the nutrition of the cementum and the relationship of the tooth to the surrounding tissues will be maintained, irrespective of the life or death of the dental pulp.

It then may be conceded that as a result of the death of the pulp the enamel and dentin are simultaneously devitalized, but if the peridental membrane is not injured by trauma, chemicals, or infective agents, the cementum of the tooth remains alive and the tooth is maintained in a physiologic relationship with the surrounding tissues. As long therefore as the cementum and peridental membrane are healthy and uninjured, the tooth as a whole cannot be said to be dead nor is it a foreign body.

The question then arises as to what changes take place in the enamel and dentin after death of the pulp and whether or not such dead tissues are safely retained in the mouth. As has been pointed out, the enamel is normally an inert calcific structure incapable of true metabolic change. It is true that the living pulp seems to preside over certain physical characteristics of the enamel but the fact remains that inasmuch as it contains little or no organic material, the changes in that structure subsequent to the death of the pulp are confined to certain alterations of its physical characteristics. There is therefore no evidence that the enamel of a pupless tooth may become harmful to the surrounding tissues as the result of postmortem changes.

In the case of dentin, the problem is more involved. After the death of the pulp, if the pulpal tissue be not removed, decomposition ensues and if bacterial organisms are present a favorable opportunity for their growth is offered. The products of decomposition and infection may then spread to the surrounding tissues thru the apical or accessory foramina, in which case the pulpless tooth becomes a real menace.

When the pulp is removed alive or immediately after death, the pulp canals may be effectually cleansed of pulpal tissue. There remains, however, after such procedure, a considerable amount of organic material in the dentin, namely, the dentinal fibrillae, lying in the dentinal canals, which comprise about one-tenth of the entire dentin matrix. The question is, What becomes of this organic matter after the death of the pulp? It is stated that the products of proteolytic decomposition taking place in these fibrils constitute a continued source of danger in all pulpless teeth. Certain operators recommend the use of strong alkalis for the purpose of disintegrating and removing this organic matter, but this procedure merits the objection that the use of strong akalis is dangerous, as

it may do serious and permanent damage to the periapical tissues. Other operators have advised the use of resins and other similar compounds which are intended to hermetically seal the dentinal tubuli on their pulpal ends, thus inclosing the fibrillae as it were in an individual sarcophagus. This method is also of questionable safety as the perfection and permanence of this sealing is always problematical and there is also the possibility of the escape of putrefactive products from the distal ends of the dentinal tubuli thru the cementum. There then remains a third method which consists in the impregnation of the dentinal fibrillae with some substance that will enter into combination with the organic matter to render it permanently innocuous. For this purpose, silver has been most widely used, which seems to meet the situation very effectually. Other chemical compounds are being tested at the present time with the hope that one may be found which will accomplish the purpose fully as well but which will not discolor the tooth.

Providing then that the pulp may be removed from a tooth without injury to the periapical tissues or the introduction of infectious organisms into them, and providing that the pulp canals may be cleansed, the dentinal fibrillae impregnated with some suitable material and the pulp canals hermetically filled and sealed, there is no evidence that such a tooth should be declared unsafe. Altho the dentin and enamel are dead, they are rendered innocuous to the surrounding tissues and as long as the peridental membrane is uninjured, the relationship of the tooth to its environment seems to remain in every way normal and identical with that which existed during the life of the pulp.

When as a result of traumatism or the use of strong drugs incident to the removal of the pulp, or from the introduction of infectious organisms subsequent to the death of the pulp, marked disturbances and injury of the peridental membrane have been produced, the problem becomes still more complex. Following all such peridental injuries, circulatory and inflammatory disturbances are set up which seriously disturb the nutrition of the peridental membrane and the cementum which lies adjacent to it. Injuries to these supporting and attaching tissues are of a very great significance to the tooth as it is upon the outcome of subsequent inflammatory reactions that the life history and the safety of the tooth depend. Fortunately the peridental tissues possess a high state of resistance and a remarkable degree of recuperative power by which they are able to withstand and to recover from many injuries and indignities which may be inflicted upon them. But when by reason of the severity or character of the injury the protective powers of the peridental tissues are overcome, that portion of the peridental membrane most seriously affected dies and undergoes certain necrotic changes depending on the type of injury. When this occurs, the cementum lying adjacent to the necrotic membrane is cut off from its source of nutrition and also dies. The cementum and pericemental membrane in other portions of the root may be alive and in an approximate state of health, but at the point of injury these tissues are entirely dead and their relationship to the surrounding tissues is similar to any other necrotic tissue.

In many respects such a condition may be compared to a localized injury and death of the periosteum of a long bone as a result of which the superficial layers of the bone at least will become necrotic and act as a foreign body toward the surrounding tissues. Resolution of such diseased bone may be accomplished by the sequestration and sloughing off of the necrotic tissue or by surgical interference and removal of all affected tissues. In the case of necrotic cementum and pericemental membrane, we see that

the anatomical location of these tissues does lend itself to their sequestration or exfoliation. It is possible that under favorable conditions, very small areas of necrotic tissue may be resolved and restored to health by inflammatory processes of the surrounding tissues but the hope that this may be accomplished in cases of any considerable extent is ill-founded and contrary to fact. There then remains only one further method of treating such cases, namely, by surgical interference.

By surgical measures, the affected portion of the root may be bared and the necrotic peridental tissues may be removed by curettage. If the root canals of the tooth have been properly cleansed and filled according to the principles previously outlined, the necrotic root end may be excised with the hope that the defect will be completely replaced by healthy granulations from which mature peridental tissues will be developed. But the stump of a root so incised will present on its surface the exposed ends of many cut dentinal tubuli, the contents of which may be in varying stages of necrosis. Obviously, such tissues are not compatible to their surroundings and unless some protective measure is employed, they will not be safe. The most hopeful solution of this difficulty has been made by Drs. Rickert and Lyons, who have suggested the precipitation of silver over the end of the root stump to hermetically seal the dentinal tubuli. A large number of clinical cases so treated give every evidence that the method is rational and that by its use many types of localized root end necrosis may be successfully handled. The silver covering to the root stump is in truth a foreign body but the character of that metal is such that it is well tolerated by the surrounding tissues while the remaining healthy portion of the root maintains the tooth in physiologic relationship with these tissues.

To recapitulate:

1. A pulpless tooth is not wholly dead nor is it a foreign body as long as its peridental membrane is normal.

2. Whenever the peridental membrane is injured or infected, the status of the tooth and its safety are always questionable.

3. Cases of incipient injury to the peridental tissues may under proper treatment make a remarkable recovery.

4. Whenever the peridental membrane dies, the adjacent cementum also dies and at that point the root acts toward the surrounding tissues as a foreign body.

5. Teeth having areas of necrosis in the cementum and pericementum frequently may be made safe and compatible to the surrounding tissues by proper surgical measures.

REPORT OF DENTAL EDUCATIONAL COUNCIL OF AMERICA

By ALBERT L. MIDGLEY, D.M.D., F.A.C.D., Secretary, Providence, Rhode Island

In accordance with the provisions of section 3 of the constitution and by-laws of the Dental Educational Council of America the report of the secretary for the past year is herewith submitted:

At the time the Council presented its initial classification of the dental schools of this country at Chicago in 1918, a new and profound interest arose in dental education, and with it a most complete recognition and indorsement of the work in which the Council had labored so untiringly. There is no doubt that the interest thus developed was not merely spasmodic and temporary but continuous and sustained and at the present time is growing both in scope and in character.

In view of the fact that there is, apparently, in this country more or less confusion and misunderstanding as to the organization of the Council, its aims, methods, policies and standards, the following report is presented with the hope of clarifying this situation.

Inasmuch as the profession, the public, the dental schools and state examining boards are so actively and earnestly co-operating in the work of the Council, it appears absolutely imperative, for the good of dental education and the continuance of the Council's work that we rehearse the history of the organization of the Council, discuss its functions and present for your consideration briefly and frankly the reasons for some of its past actions.

ORGANIZATION OF THE COUNCIL

The Council was created at the meeting of the National Dental Association at Old Point Comfort, Virginia, in 1909, for the purpose of advancing dental education and unifying the standards of the various bodies in the dental profession thru action taken by the National Association of Dental Examiners and the National Association of Dental Faculties and is therefore the only agency in dentistry that has the unqualified support and indorsement of all of these organizations. It is not too much to say that it has already become one of the vital forces in the elevation of dental education in this country.

The three organized bodies of the dental profession that the Council represents today are the National Dental Association with more than 28,000 members, or 70 per cent of the dental profession; the National Association of Dental Examiners, which has in its membership 48 of the licensing boards of the United States; and the National Association of Dental Faculties with a membership of 31 schools, 18 of which are organic parts of universities.

The American Institute of Dental Teachers has no representation on the Council because the principle of double representation would arise from such membership and this might work an injustice, at times, to the other two parent bodies.

CREED OF THE COUNCIL

Stated briefly, common sense and honesty of purpose in all its activities represent the creed of the Council. Mindful of the reasons for its existence, the Council believes that in the application of principles which are involved in the performance of its duties, it must study every problem from three aspects, namely, academic, professional, and legal. It is quite evident, therefore, that it would be impractical and not common sense for the Council to view any problem from one standpoint alone, to the neglect of either of the other two aspects.

Honesty and what it signifies, namely, prudence, justice, forbearance and moderation, have at all times been the guide of the Council in its deliberations and conclusions. Ordinarily it would be superfluous and vain to make a statement of this kind in a report relative to those essentially vital standards that should govern men in their actions but it is offered for the sole reason that those interested may learn the extent and degree of the Council's interpretation of this virtue in application of its standards and policies.

METHODS, POLICIES AND STANDARDS OF THE COUNCIL

The Council realized that if its findings were to be supported and indorsed it should be governed by modern methods, fair and broad pol-

icies and wise and practical standards. In our deliberations at all times we have directed careful attention to the needs of the people; deep concern for the entering student; due regard for the welfare of the profession and hearty support and encouragement to the schools. Since each and every problem had to be studied with these thoughts in mind, it is quite obvious that the Council should not be governed entirely by our larger institutions of learning, yet it must be admitted that these agents exerted a very strong influence in creating and developing the character and extent of dental educational standards.

In attempting to reach the ideal in the field of education, we must admit that speculation and conjecture have no place. To enforce standards without a full knowledge of the facts and an exhaustive analysis of conditions and theories is surely not in harmony with common sense. Another reason why the Council has never indulged in speculation is because standards concerning the health and happiness of the people of this country were under consideration. The Council never expects to reach perfection nor hopes to attain the ideal in dental education, but it does earnestly desire to reach a practical ideal.

With these thoughts in mind, the Council has adopted under its best judgment, sound, broad policies and standards and has tried to enforce them in a practical manner, that weaker schools honestly striving to better themselves might not be annihilated and that the dental needs of the areas of smaller population might be well cared for. It has also seen to it that the activities of our stronger institutions of learning might not be restricted, and the advance of dental science thus retarded. It has tried to act in such a way that the interests of the entering student might be well guarded and protected in order that he should not be rendered incapable of offering all that dental science requires.

At this time it is appropriate for the Council to state frankly the reasons why it believes it is not an opportune time to enforce the pre-dental year as a requisite for a Class A rating.

From a twelve to fifteen-year statistical review, we find that the annual national wastage from death, change of vocation and other causes in the dental profession is nineteen hundred. During the three years of which we are now in the midst, class enrolment and graduation statistics indicate that there will be a decrease of from twelve to fifteen hundred in the number of men entering dentistry in these three years.

In view of the fact that there is a greater demand for dental service today than ever before, is it common sense to restrict the number of men entering dentistry, when the above mentioned indisputable and authoritative figures are before us? Even tho dental science has enlarged its usefulness, is it common sense and good judgment for us to name a date on which we will require the pre-dental year, when we have very meager knowledge of the adequacy of the four year product to meet the present demands of the public? Does it not appear that we might be accused of speculating in dental educational standards, if we name a date with this evidence before us?

Let us reflect upon the fact that dental operations properly performed require more care and time now than formerly and remember also the fact that the two-year standard was the maximum requirement for twenty years, and the three year standard the maximum requirement for twenty-nine years, and that if we enforce the pre-dental requirement now, the four year standard will have been the standard for but four years. It does not seem to be the part of wisdom to drive dental educational standards too rapidly.

Furthermore, no substantial reason has ever been advanced to the Council to justify the conclusion that it should force upon certain sections of the country a universal preliminary standard of dental education that it believes is not possible under present conditions to maintain, let alone to exact now from the prospective student. Without in the least undervaluing the high attainments of institutions with the more rigid requirements, one must nevertheless take into account the satisfactory character of many of the graduates of less exacting schools, without whom the country as a whole would be sparsely supplied as regards sound dentistry.

In the long run, love of the profession and the public's verdict of approval are enough to impel most men to receive the finest possible preparation available to them. Against those otherwise inclined, the standards now in force furnish both the public and the profession with a high degree of protection.

The Council will enforce the pre-dental year when it is convinced that the schools requiring the pre-dental year can supply the demand for dentists the country over, or when it becomes evident that a sufficiently large number of students with this or a greater amount of preliminary training seek admission to the dental profession, but this is not now the case and never has been. This statement does not carry the inference that the Council opposes this advanced standard for any one section of the country, but merely recognizes that it is not practicable to attempt to maintain a standard for the entire country that is reasonably adapted to only certain sections of it.

MINIMUM REQUIREMENTS

The minimum requirements as adopted by the Council at Pittsburgh in 1920 represent its best thought and judgment as to what a fully acceptable dental school should offer the prospective student at the present time. It does not present it as the last word in our dental educational system, but believes that it meets present-day requirements and is an advance over the previous standard.

The Council wishes to refer again to the fact that the standards it has adopted for an "A" grade school are its minimum, and not the maximum requirements. This statement is made because some of those who disagree with the Council fail to realize that such is the case, and unfortunately they draw illogical and unsound conclusions because their premise is incorrect.

As a result of the classification of schools, it will be quite evident in the near future that only those schools will survive which can demonstrate their right to exist purely as institutions of learning. The Council has authoritative information that many schools are beginning to meet these requirements and that, if a yet higher standard is not enforced too quickly, the needs of the country will be better taken care of and the science of dentistry advanced with reasonable celerity. Many schools no doubt do not fully measure up to the minimum requirements at the present time, but we are quite hopeful they will in the very near future. It should be stated again to those who desire to attain higher standards that the Council functions merely on minimum requirements and that these standards were adopted after careful consideration had been given to the dental needs of the people of this country and to the advance of dental science.

THE CARNEGIE FOUNDATION

Years ago the profession was interested in dental science only here and there, but now the interests of our members in the molding of our future dental product is quite general.

Another evidence of the practical interest that is being taken in dental education is the fact that the Carnegie Foundation for the Advancement of Teaching has requested the co-operation of the Council in a study of dental education which the Foundation is about to undertake. The Dental Educational Council welcomes and indorses this movement and most willingly offers to the Carnegie Foundation for the Advancement of Teaching all of the assistance and co-operation that it is within the Council's power to give.

CLASSIFICATIONS

The Council announces at this time that the only change in the 1920 classification of the schools of the country is that the Chicago College of Dental Surgery has been granted an "A" rating.

FINANCES

I believe that if the work of the Council is to be advanced it is our immediate duty to inspect all of the "A" grade and certain of the "B" grade schools during the coming year.

If the Council is to keep abreast of the times in bettering dental education, adequate provision should be made in a financial way so that the exacting work and heavy expense that the inspection of schools entails may be carried out. The Council wishes to take this opportunity to thank the National Association of Dental Faculties for the substantial co-operation it has extended to it during the past year. Without its aid financially it is needless to say that it would have been impossible for the Council to have functioned properly. We wish to thank, too, the National Association of Dental Examiners and the National Dental Association for their very generous financial assistance and also for the keen interest they are taking in the work of the Council.

1921 classification of the dental schools of the United States by the Dental Educational Council of America:

CLASS A

University of Southern California, College of Dentistry, Los Angeles, Cal.

University of California, College of Dentistry, San Francisco, Cal.

Chicago College of Dental Surgery, Chicago, Ill.

Northwestern University Dental School, Chicago, Ill.

University of Illinois, College of Dentistry, Chicago, Ill.

University of Iowa, College of Dentistry, Iowa City, Iowa.

Harvard University Dental School, Boston, Mass.

Tufts Dental College, Boston, Mass.

University of Michigan, College of Dentistry, Ann Arbor, Mich.

University of Minnesota, College of Dentistry, Minneapolis, Minn.

St. Louis University Dental School, St. Louis, Mo.

Creighton University, College of Dentistry, Omaha, Nebraska.

University of Buffalo, Dental Department, Buffalo, N. Y.

Ohio State University, College of Dentistry, Columbus, Ohio.

North Pacific Dental College, Portland, Ore.

The Thomas W. Evans, Museum and Dental Institute, University of Pennsylvania, Philadelphia, Pa.

University of Pittsburgh, College of Dentistry, Pittsburgh, Pa.

Vanderbilt University, School of Dentistry, Nashville, Tenn.

Medical College of Virginia, School of Dentistry, Richmond, Va.

Marquette University, College of Dentistry, Milwaukee, Wis.

CLASS B

College of Physicians and Surgeons, Dental Department, San Francisco, Cal.

Colorado College of Dental Surgery, Denver, Col.

Georgetown University, School of Dentistry, Washington, D. C.

Howard University Dental School, Washington, D. C.

Atlanta-Southern Dental College, Atlanta, Ga.

Indiana Dental College, Indianapolis, Ind.

University of Louisville, College of Dentistry, Louisville, Ky.

Loyola University, School of Dentistry, New Orleans, La.

Tulane University, School of Dentistry, New Orleans, La.

Baltimore College of Dental Surgery, Baltimore, Md.

University of Maryland, Dental Department, Baltimore, Md.

Kansas-City-Western Dental College, Kansas City, Mo.

Washington University Dental School, St. Louis, Mo.

University of Nebraska, College of Dentistry, Lincoln, Neb.

College of Dental and Oral Surgery of New York, New York, N. Y.

New York College of Dentistry, New York, N. Y.

Ohio College of Dental Surgery, Cincinati, Ohio.

Western Reserve University, Dental School, Cleveland, Ohio.

Philadelphia Dental College, Philadelphia, Pa.

University of Tennessee, College of Dentistry, Memphis, Tenn.

Meharry Dental College, Nashville, Tenn.

Baylor University, College of Dentistry, Dallas, Tex.

CLASS C

Cincinnati College of Dental Surgery, Cincinnati, Ohio.

University of West Tennessee, Memphis, Tenn.

Texas Dental College, Houston, Tex.

CLEFT PALATE AS A LOCAL EVIDENCE OF A GENERAL FAULTY DEVELOPMENT OF THE OSSEOUS SYSTEM

By J. S. FOOTE, M.D., Omaha, Nebraska

THE embryological formation of the hard palate as given by Keith[1] is as follows: "The hard palate (with the exception of the premaxillary part) is formed by a horizontal plate which grows inward from the maxillary process in the latter part of the second month and fuses with the plate of the opposite side during the third month. The horizontal plates meet first with the premaxillary part; behind that they come in contact with each other, the process of fusion spreads backward and by the end of the third month is complete. The condition of cleft palate is due to partial or complete failure of the process of fusion." Brophy considers cleft palate "as a fissure, a separation of well-developed parts—not the result of arrested development, nor failure of the normal quantity of tissue to enter into the structure. It is practically a wound."[2]

The causes of cleft palate are attributed by some (Brophy)[3] "to the pressure of the tongue and mandible against the alveolar inclined planes," by others (Keith) "to pressure of the tongue and the independent process of growth in each individual."[4] The majority of cases give an ancestral history of some deformity or nervous defect. It is not necessarily true that cleft palate in an ancestor will be followed by cleft palate in the offspring; but it is more than probable that cleft palate in the ancestor will be followed by some defect in the offspring. It is too often the case that, in our estimate of heredity as a causative factor, we expect precisely the same defect to be transmitted to the offspring as occurred in the ancestor; whereas it is possible that such a defect is merely a local expression of a general, faulty development and may be cleft palate or something else.

The congenital defects associated with cleft palate as given by Brophy[5] are: "hydrocephalus, inguinal and umbilical hernia, club feet, supernumerary ear, six toes on each foot, two thumbs on one hand, hypospadias, web fingers and toes, three deformed fingers, curvature of the spine, spina bifida, absence of one eye, absence of premaxillary bones, harelip single and double, protruding premaxillary bones, fissures in the cheek extending from the harelip to the inner canthus of the eye, angioma." An association of such a group of widely different defects as this—half of which are directly connected with the osseous system, could hardly be due to different local causes.

[1]Arthur Keith, *Human Embryology and Morphology* (3d ed., 1913).

[2]Truman W. Brophy, *Oral Surgery*.

[3]*Ibid.*

[4]Keith, *op. cit.*

[5]Brophy, *op. cit.*

Physiological development in an embryo is visualized by histological differentiation, and this can be more readily determined in a fixed tissue, like bone, than in the soft tissues.

Interesting variations in bone differentiation during embryonic life have been studied in sections of human, fetal femora of different ages, one of which is the femur of a cleft palate fetus of eight to nine months, and in adult palate bones, one of which is cleft palate, complete, congenital. Fetal femora are examined because they are remote from the local defect and the evidence which they furnish will be of a general instead of local character. It has been shown in a previous article[6] that the structure of the femur in the adult represents the structure of all of the long bones and the degree of differentiation present in the skeleton of the individual from whom the femur was taken.

Again, certain important histological evidences have appeared during the study of bone which lead one to think that it is derived from the circulatory vessels and that its valuation as a tissue at any time depends upon the degree of development of the circulation.[7]

During the examination of a large number of sections of bone (1,100) extending from fish to and including man, two types of circulation (the branching and plexiform) are found[8] to belong respectively to the first, second and third types of bone. This simplest type of circulation, branching, is found in the simplest type of bone structure (lamellar) and the most complex (plexiform) in the laminar and Haversian system types. A combination of the branching and plexiform is found in a combination of the lamellar and laminar or Haversian system types. That is the type of bone varies according to the type of circulation.

The bones of the cranium are lamellar with branching circulation, while the long bones are either lamellar and Haversian system or Haversian system alone with a combination of the branching and plexiform or of the plexiform alone. The cranial bones are, therefore, earlier in structural type than the long bones. In the adult the hard palate is a lamellar or first type bone with a branching circulation near the lower or oral surface and large vascular canals, surrounded by lamellae, in the interior. These appear in cross-section.

In Plate I are represented cross-sections of six human, fetal femora of different periods of differentiation. The section in each case is taken from the center of the shaft of the bone. One of these sections (Fig. 6) is a cross-section of the femur of a cleft-palate fetus of eight to nine months.

In Plate II are shown sections of three left adult maxillary processes and their adjoining bones. One (Fig. 9) is a cross-section of complete cleft palate; age thirty-five to forty. The sections of the femora and palate bones are grouped separately for the purpose of comparison.

Figure 1 (Plate I) is a cross-section of a fetal human femur of two to two and one-half months. The section is composed of two concentric rings of bone substance, external and internal. The external, much the wider, is composed of channeled bone substance with round lacunae and relatively few canaliculi. The internal is composed of bone sub-

[6] J. S. Foote, "A Contribution to the Comparative Histology of the Femur," *Smithsonian Contributions to Knowledge*, Vol. XXXV, No. 3, 1916.

[7] Foote, "The Circulatory System in Bone," *Smithsonian Miscellaneous Collections* (in press).

[8] Foote, "The Teeth and Bone of the Mascalonge-Esox of Wisconsin Waters," *Jour. Nat. Dental Assoc.*, VII (December, 1920), 993.

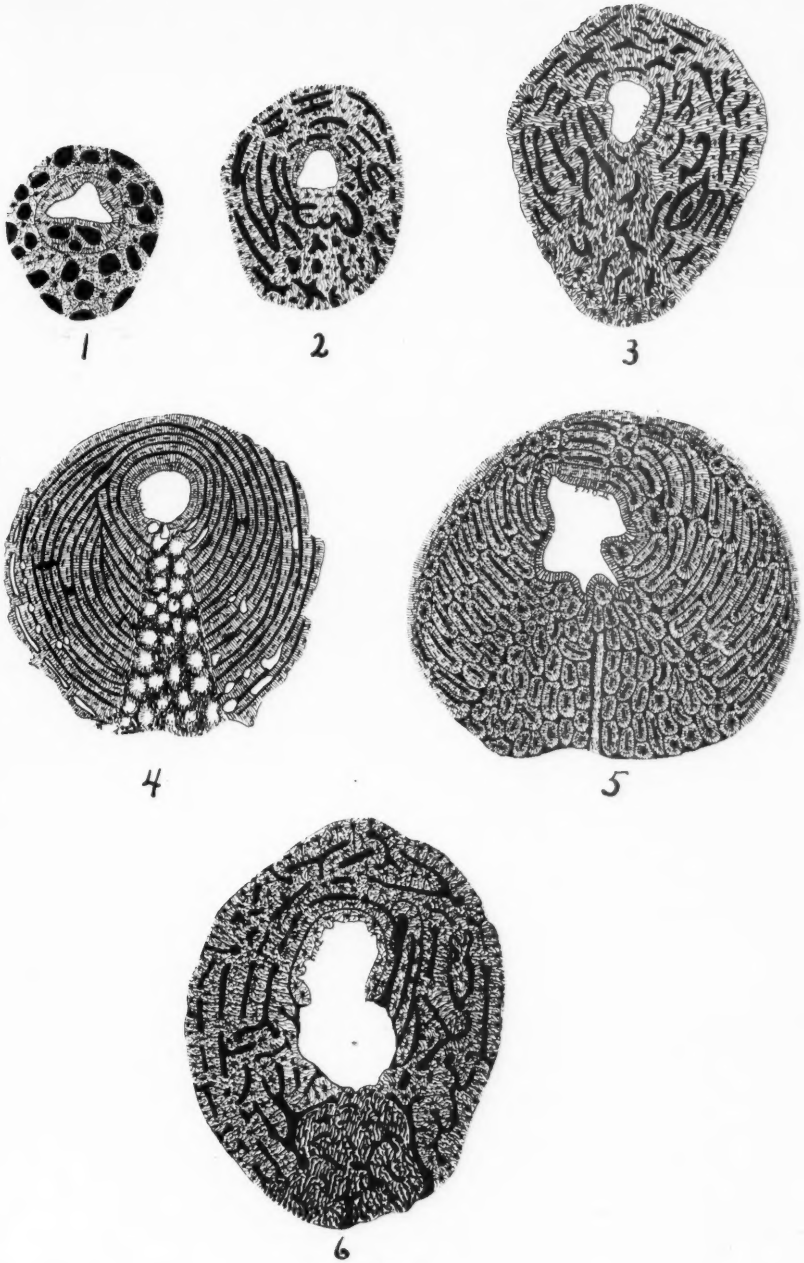

Plate I

1, Cross-section of the femur of a two to two and one-half months' human fetus; 2, at three to three and one-half months; 3, at four to four and one-half months; 4, at six to six and one-half months; 5, at eight to nine months; 6, cross-section of the femur of an eight to nine months' human cleft-palate fetus.

stance with long lacunae, a long bushy canaliculus.

Figure 2 is a section of a fetal human femur of three to three and one-half months. The anterior wall is much thinner than the posterior. The section is composed of bone substance within which

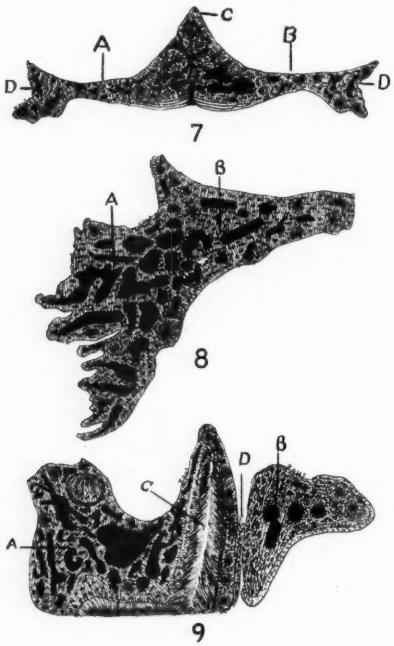

Plate II

7, Cross-section of hard palate of adult; *A* left, *B* right horizontal plate; *C*, mid-line; *D*, junction of palate with maxillary process. 8, Cross-section of left maxillary process and left half of hard palate: *A*, maxillary process, *B*, hard palate. 9, Cross-section of left maxillary process and cleft palate: *A*, maxillary process; *B*, left half of hard palate; *C*, fang of second molar tooth; *D*, union of maxillary process and hard palate.

are irregularly shaped vascular canals having a general concentric arrangement around the medullary canal. The lacunae of the bone substance are round or oval with bushy canaliculi. The posterior wall is composed of bone substance with vascular canals extending radially and divided into short segments presenting a slight evidence of Haversian systems. Internal circumferential lamellae are present in the anterior wall.

Figure 3 is a cross-section of the femur of a four to four and one-half months white fetus. The medullary canal is small and eccentrically situated. The section is composed of bone substance with oval lacunae and bushy canaliculi in which are wide, irregular vascular canals arranged more or less concentrically. A few crude Haversian systems are found in the posterior wall. Figures 1, 2, 3, represent bone differentiation of the first half of fetal life; Figures 4, 5, of the last. A marked difference between the two periods may be seen.

Figure 4 is a section of the femur of a white fetus of six to six and one-half months. Undifferentiated bone substance has become differentiated. The section is composed of a wide horseshoe-shaped band of laminae arranged around the medullary canal, posterior ridge excepted. The laminae are composed of bone substance separated by vascular canals. They widen and shorten into crude Haversian systems as they approach the posterior ridge. The posterior ridge is composed of elongated spaces surrounded by bone substance extending from the external to the medullary surface. It is later in differentiation than the anterior and lateral walls. Internal circumferential lamellae surround the medullary canal.

Figure 5 is a cross-section of the femur of a white fetus of eight to nine months. The medullary canal is irregular in shape and situated in the anterior portion of the section. Around the outside of the section, posterior ridge excepted, is a narrow band of lamellae, external circumferential, which were not

seen in the femur of six to six and one-half months. Just underneath this is a single row of fairly well developed Haversian systems. The remainder of the anterior and lateral wall is composed of elongated sections of Haversian systems shortening and widening into more and more complete forms as they approach the posterior ridge, which is composed of crude Haversian systems. In the center of the ridge is a narrow space extending radially where the posterior is about to unite. This femur is considerably in advance of that shown in Figure 4.

Figure 6 is a cross-section of the femur of a cleft palate fetus of eight to nine months, the bone being of practically the same age as that shown in Figure 5. A wide difference in differentiation can be seen. The anterior-posterior diameter of the section in Figure 6 is longer in proportion to the lateral than in Figure 5, and the medullary canal is proportionately larger. That is, there is less bone in Figure 6 or the cleft palate femur than in the femur represented in Figure 5.

Structure of the cleft palate femur: The section has no external circumferential lamellae as is seen in Figure 5. It has only a partial band of crude bone substance around the anterior wall of the medullary canal, instead of the well-defined internal circumferential lamellae seen in Figure 5. The body of the section in Figure 6 is composed of more or less, concentric crude laminae separated by irregular, vascular canals. The laminae are composed of undifferentiated bone substance with infrequent round or oval lacunae and comparatively few canaliculi. Minute slit-like channels are seen crossing the external laminae. Similar channels have been seen in the bones of the fish. Comparing Figure 6 with Figure 5, a marked differentiation is seen. The posterior ridge in Figure 6 is composed of bone substance with many groups of large lacunae arranged between the large, irregular, vascular canals. Comparing again the bone differentiation represented in the cleft palate section with the differentiations seen in the other five, it may be seen that the cleft palate differentiation resembles that present in Figure 3 more closely than that in Figure 5 or the differentiation at the close of the first half of fetal development more closely than that at the close of the last half.

In Plate II are shown drawings of three adult palate bones. Figure 7 shows a cross-section of an entire hard palate: *A* is the left, *B* the right half and *C* the center of the bone; *D*, union of the palate with the maxillary processes. The section is composed of the first or lamellar type of bone with numerous large, small and irregularly shaped vascular canals extending antero-posteriorly and a few Haversian systems extending in the same direction. Along the inferior surface adjoining the mid-line, are seen three or four laminae.

Figure 8 shows a cross-section of the left maxillary process with its left palate bone: *A*, maxillary processes, *B*, palate bone. There is no line of demarcation between these two bones, the palate bone being an extension of the maxillary process. The section is composed of first or lamellar type of bone in which are many large, irregularly shaped, vascular canals extending antero-posteriorly. Here and there are seen cross-sections of well-developed Haversian systems both in the maxillary process and in the palate bone. The occurrence of Haversian systems extending antero-posteriorly in the horizontal palate bones rather weakens the idea that these systems are for mechanical purposes as it is difficult to understand what mechanical purpose they could serve.

In Figure 9 is seen a cross-section of the left maxillary process and palate bone of a complete congenital cleft palate of an adult: *A* is the maxillary process, *B* the palate bone, *C* the root of the second molar tooth, and *D* the union of the maxillary process with the palate bone. The maxillary process is composed of first or lamellar type bone in which are many large, irregularly shaped vascular spaces or canals and a few Haversian systems extending antero-posteriorly. It incloses a root of the second molar tooth with a small portion of the body. The oral border just internal to the root is a narrow strip of bone in which are numerous Haversian systems extending antero-posteriorly. Almost separated from the maxillary process is the palate bone attached by a small connective tissue union. It is composed of connective tissue with vascular canals and two small fragments of bone in which are two Haversian systems near the upper and right borders. The inferior border is covered by epithelium. Comparing this section with that seen in Figure 8 it may be seen that the palate bone in Figure 9 is atrophied and does not seem to be an extended horizontal plate from the maxillary process, as in Figure 8, but a connective tissue union with it. Evidences of degeneration are present thruout the palate. Evidently repair would be a connective tissue repair if it repaired at all.

Looking over the foregoing femoral sections it will be seen that the important period of bone differentiation occurs about midterm of fetal life and the cleft palate femur at birth has about the differentiation of that period. Looking over the palate bone of the adult it will be seen that a failure in bone differentiation has occurred in the cleft palate case on account of which the maxillary process and horizontal plate are united by a connective tissue union instead of a bone extension and that bone appears in the plate only to a very slight extent. From this it may be inferred that some disturbing factor, possibly in the thymus, had arisen in the cleft palate fetus during the last half of its development in the uterus which had checked the progress of bone differentiation and therefore the fusion of the horizontal plates. The result was that the fetus reached the age of eight to nine months with the general bone development of less than four months; that is, cleft palate is a local evidence of a check in the development of the osseous system as a whole, as is indicated by the section of the femur in Figure 9. The effect of this check in osseous development, on account of which the inorganic salts of the whole skeleton must be proportionately deficient, is a factor of real importance in the further development and welfare of the child in the years which follow birth. The mortality of complete cleft palate cases is high in early life, perhaps due to starvation, as it is difficult to feed these infants. But there would seem to be a more important cause than this. Repairing the palate by surgical operation removes the physical difficulty in feeding, but it does not transform the half-time bone differentiation to a full-time bone differentiation. The cleft-palate child would begin life half equipped to meet the general metabolic requirements of its new and different condition and unless it caught up, in some way, with the normal bone development of its age it would fall behind in the race of life.

The fetus represented in Figure 9 was born dead, not on account of the cleft palate, of course, but on account of some pathological change, perhaps of an endocrine nature which prevailed at the time of greatest bone differentiation and by reason of which the viability of the embryo was so far imperiled that it could not keep pace with the developmental forces which were operating together toward completion. If the child

had been born alive the same result might have followed, as the matter of birth would have changed nothing, but the act of feeding would be much more difficult to accomplish than it was before birth.

The mortality of fetal life: The mortality at nine months' development at the Sloan Hospital, New York, was 6.8 per cent in 10,000 cases[9]; the mortality at seven and one-half months, 25 per cent; seven months, 60 per cent; six and one-half months, 80 per cent; six months, 90 per cent; less than six months, 100 per cent, (with incubator, 932 cases, Paris hospital).[10]

[9]Foote, "A Contribution to the Comparative Histology of the Femur," *Smithsonian Contributions to Knowledge,* Vol. XXXV, No. 3, 1916.

[10]Foote, "The Circulatory System in Bone," *Smithsonian Miscellaneous Collections.*

Survival of the child after birth depends upon its stage of development or its adaptability to a new and different environment. It is impossible to state this in exact terms physiologically: but physiological development is indicated by histological differentiation and this is more readily determined in bone than in the soft tissues. From the sections which follow it may be seen that time in months is not an evidence of the degree of development. A child may be born at full time with half-time development, which seems to be the case with the cleft-palate child. It is in the nature of unfinished business which is laid over and may or may not be taken up and completed by a coming administration. Thus the cleft palate may be considered as an evidence of a general defect in osseous differentiation.

SAY IT WITH CHRISTMAS SEALS TO WIDOWS, ORPHANS, AND INDIGENT DENTISTS

By OTTO U. KING, D.D.S., F.A.C.D., Chicago, Illinois

THERE are treacherous wayside places on the highway of life. Many dentists fall among thieves and are stripped of their raiment and left wounded and destitute near the end of the way. Dentistry should be financially prepared to take care of our loyal members who meet with a San Francisco earthquake and fire, a Johnstown or Galveston flood or a Halifax disaster. No one knows when a wreck, explosion or some accident or great financial calamity may befall us, something which may take even the most frugal unaware, leaving us maimed and financially stranded without any visible means of support for ourselves or families. A little assistance from our Relief Fund will be of inestimable value to some of the indigent members of our profession who may have lost their all. Surely, one dollar is a very small sum for an annual contribution to such a worthy cause.

We have in our great national body men who have given their time, sacrificed their home, in fact their lives, for the advancement of the cause of dentistry. I know some of these men who have traveled over the country, giving lectures before various dental societies without having been reimbursed for either their traveling or hotel expenses. These men who have done pioneer work—the men who laid the foundation for the dentistry we are enjoying today—should not in their declining days be left to a cruel world by being compelled to live in public charitable institutions.

The wife of one of these pioneer dentists today is going from house to house in one of our large cities selling vegetables. Her husband died a few years ago. He contributed many original articles that helped to advance the cause of dentistry. He also was the author of one of our dental textbooks. This man was a real forerunner to modern dentistry for he appeared before dental societies for over forty years; in fact, he gave his very life's blood for the advancement of dentistry, without any thought of compensation. I know other men today who are absorbed in great dental research problems, the solution of which will very materially advance the cause of scientific dentistry. These patriotic scientists are giving their best for dentistry and humanity, without any thought of compensation. They are unable to make adequate provision for the proverbial rainy day. This non-productive period in each one of our lives is bound to come and why should not every member of the dental profession gladly and willingly contribute one dollar ($1.00) a year to the sale of Christmas seals. Let's say it with flowers while these

men are still living. If we have neglected to discharge our bounden duty to these men who have done so much for us we should then be in a position to say it with dollars to those who are left to carry on the burdens of the family's existence.

The Relief Fund has grown from $3,500 in 1913 to $64,975.74, July 15, 1921. The plan provides for the creation of an endowment of $100,000. When this amount is secured, then the money received from the interest on this fund, together with the amount collected from the continued sale of Christmas seals, will be available for relief purposes.

We are gratified with the fine spirit manifested by many members of our Association who annually make a contribution to this worthy cause. However, we are chagrined and unable to satisfactorily explain to ourselves why some men do not contribute to this fund, which means comfort for the declining days of many of our members. We want to think that it is just negligence, rather than deliberate indifference.

Thirty-five thousand packages of Christmas seals will be mailed on December 1. If every one, upon the receipt of these Christmas seals, will immediately return his check for at least $1.00, we will not only reach our aim of $100,000 this year, but we will have available for immediate relief purposes several thousand dollars. Many organizations, trade unions, and societies are manifesting a spirit of farsightedness today in collecting funds in order that they may render practical service to their unfortunate members. The dental profession which has such high aims will not fail to discharge its obligation to the members of its own family.

THE RELIEF FUND LEDGER

Since the inception of this Relief Fund, an accurate ledger has been kept of the contributions received from individuals, and the total amount by states.

The contributions by states for the year 1921 reported to the House of Delegates at the Milwaukee meeting are as follows:

	Amount Received	Number of Members
Alabama	$ 48.00	249
Arizona	14.00	42
Arkansas	37.50	96
California	573.50	1592
Colorado	157.50	362
Connecticut	234.00	487
Delaware		38
District of Columbia	91.00	252
Florida	59.00	162
Georgia	84.00	321
Hawaiian Islands	22.00	34
Idaho	44.00	65
Illinois	1127.50	2830
Indiana	357.00	1156
Iowa	322.25	958
Kansas	155.50	508
Kentucky	105.00	404
Louisiana	87.20	208
Maine	67.50	197
Maryland	114.50	241
Massachusetts	335.50	1372
Michigan	307.75	978
Minnesota	341.00	1169
Mississippi	38.50	207
Missouri	274.50	1035
Montana	42.00	118
Nebraska	140.50	484
Nevada		
New Hampshire	33.00	56
New Jersey	327.25	835
New Mexico	32.00	57
New York	1160.60	2311
North Carolina	86.00	277
North Dakota	76.50	163
Ohio	530.50	1581
Oklahoma	105.00	349
Oregon	95.00	308
Pennsylvania	804.50	1861
Philippine Islands		4
Porto Rico		1
Rhode Island	59.00	154
South Carolina	47.00	67

South Dakota	70.00	208
Tennessee	506.00	408
Texas	215.50	592
Utah	49.00	138
Vermont	32.00	105
Virginia	132.50	265
Washington	147.60	475
West Virginia	72.50	252
Wisconsin	340.00	920
Wyoming	15.00	65
Army Dental Corps Navy Dental Corps	35.00	120
Foreign	28.00	5
Grand total	$10,180.15	27,142

NOTE—National Capitol and District of Columbia were not listed separately in our Relief Fund ledger; neither were California State and Southern California kept separately.

Every loyal member of the National Dental Association should carefully review the record made by his state to this worthy cause during last year and then ask himself this question, Am I proud of my state's record? Will you not cooperate with the committee in an endeavor to have your state make a better showing in the Secretary's report that will be submitted to the House of Delegates next July 17 at the Los Angeles meeting?

The Union Trust Company of Chicago is the custodian for all our Relief Funds. The Secretary's office received a check in one month, October, for $666.22 (interest on bonds). This accents in an important way the earnings of our Relief Fund. This splendid fund, increasing month after month, will bring comfort to some of the unfortunte members of our big family.

The Relief Fund Committee, Drs. Edward S. Gaylord, Otto U. King, L. G. Noel, William T. Chambers, Henry McManus, Louis P. Dotterer, Charles S. Chandler, Frank I. Shaw and William Conrad are hoping that every member of our National Dental Association upon receipt of the Christmas seals will immediately respond by sending his check for $1.00 or more to the National Dental Association, 127 N. Dearborn St., Chicago, Illinois.

Let's be real Samaritans and breathe the Christmas Spirit by binding up the wounds of our unfortunate dentists.

PLEASE BUY SOME CHRISTMAS SEALS, SIR!

Please buy some Christmas Seals, Sir,
They're only a dollar a hundred—
To help some needy soul, Sir,
Among our dental kindred.

Please buy some Christmas Seals, Sir,
For the dentists who need our aid,
Fulfill your bounden duty, Sir,
Be one of our Seals brigade.

Please buy some Christmas Seals, Sir,
The Relief Fund must reach its goal,
One Hundred Thousand is our aim, Sir,
To help many a needy soul.

Please buy some Christmas Seals, Sir,
Your check to the National send,
It will help a worthy cause, Sir,
Any many a brother befriend.

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VOL. 8 DECEMBER, 1921 NO. 12

Editorial Department

THE MISTLETOE AND HOLLY

Around the blessed sentiment of Christmas cling some of the tenderest memories of our civilization. Whatever of pride or passion, of sin or shame, of struggle or strife, of turmoil or temptation, of meanness, hate, envy, jealousy or rancor may enter our lives during the rest of the year, they are all banished from mortal ken as the beautiful yuletide season casts its mellowing rays of good cheer and hope over our common humanity, and we bask in the beneficence of "peace on earth—good will to men."

As far back as our childhood days, when the world to us was young, and the traditions of the past were ancient in our ears, the hallowed

influence of Christmas chastened and sweetened our lives, and gave us glimpses of better things and inspired us to purer thoughts. On down thru the varied years, when the sterner things of life took shape and we were faced with the frowning clouds and shadows, the doubts and dreads, the fears and tears, we were yet sustained by the solace of the mistletoe and holly.

And today in ripened manhood and womanhood we weave in memory the flowers of youth around the virile plant of middle life, and bind them with loving vines to the sojourners on the western slope. Christmas makes all of us into one and shows the way to the universal brotherhood of man. Men may come and men may go but the spirit of Christmas goes on forever.

Like a blessed benediction it descends upon the sons of men each year, and sows the seeds of charity and loving kindness. It takes the sordid out of life, and plants the flowers of forgiveness. It softens the hardened heart of humanity, and makes the miser scatter his gold. It cools the fevered brow of strife, and drops the dew of love upon the parching world.

Christmas links the lives of little children with the sympathies of old age, and forces youth back again into the bearers of whitened locks. It makes the whole world young.

It brings the loved ones from far and near to mingle again around the family hearth, and watch the yule log blaze its brightest hues. And as the firelight shines on the faces of our best beloved, and the shadows dance in wildest glee upon the darkened walls, the peals of laughter chime with the crackling logs, and the anthem of the blest is wafted away from earth toward the ethereal blue.

It is then we think good thoughts and do good deeds; it is then we put away the carking cares of life, and soar aloft among the fleecy clouds.

Heaven is nearer, hearts are lighter, doubt is banished and fear lies flat upon its gloomy throne. The world is ours and the fulness thereof. and all there is of love and life, of hope and happiness unite to speed the cheery hour.

All hail to the sons and daughters of men! Christmas is here and the world is sanctified once more.

THE CHRISTMAS SEALS

In line with the foregoing the dentists of America are privileged to enter into the beautiful sentiment of Christmas thru the medium of the seals sent out annually to the members of the National Dental Asso-

ciation for the Relief Fund. These seals will have reached the members before this issue of the *Journal* is distributed, and this is merely a reminder to those who have not already sent in their contribution to please do so at once. This fund is growing at a very encouraging rate, and the income should soon be available, provided every member does his duty to the fulness of his ability. It is so easy for each dentist to contribute his dollar or more to the cause, but it is just as easy to overlook it in the rush of other matters. This is to remind the members not to forget it. *Do it now lest you forget!*

ORGANIZED DENTISTRY IN GREATER NEW YORK CITY PURCHASES CHRISTMAS SEALS

The Relief Fund Committee has received a check for $100.00 from the First District Dental Society of New York, of which Dr. J. Lowe Young is president, for the Christmas seals.

Dr. R. Ottolengui, a prominent member of the Second District Dental Society of New York, reports that this society has also passed a resolution donating $50.00 to this fund; in addition thereto the resolution contained a provision that enough seals would be purchased to place one on each copy of their December bulletin. This bulletin has a circulation of nearly 1400.

These two organizations have established a precedent that should be emulated by other dental societies. We know of no better method of advertising the work of the Relief Fund than for each dental society to purchase Christmas seals and thus put its stamp of approval on this worthy cause. When the dental profession becomes thoroly familiar with the magnanimous spirit manifested in the sale of the Christmas seals, then every member of the National Dental Association will gladly contribute $1.00 or more to this worthy cause each year. Every society that takes such action should report direct to the National Dental Association office in Chicago so that its name may be enrolled on the Dental Relief Fund honor roll. The Relief Fund Committee also deeply appreciates the generous spirit manifested by some of the advertisers in the Journal of the National Dental Association who have already contributed liberally for the 1921 Christmas seals.

We must reach our goal of $100,000 for this humanitarian project thru the sale of Christmas seals this year. Our slogan should be, *Let's go!*

LONG BEACH DENTAL SOCIETY—100 PER CENT

The southern California dentists learned that one of the big aims of the National Dental Association for the coming year was eight thousand new members, or an increase of 15 per cent in each state society. The Long Beach Dental Society, a branch of the Southern California Dental Society, set itself to the task of attaining 100 per cent for its district. The enthusiasm, zeal, and co-operation which this city put into the membership campaign resulted in harvesting into its organization every ethical dentist. The population of Long Beach is seventy thousand, with forty ethical dentists. This is an enviable record and deserves commendation and the society is to be congratulated on its achievements. Long Beach has thus visualized in a practical way what can be accomplished thru concentrated effort. Co-operation is the cornerstone of success, without which we cannot hope to erect the great and lofty structures of organized dentistry.

REMINISCENCES OF FORTY-FIVE YEARS IN DENTISTRY

It is both a privilege and a pleasure for the Journal to announce that Dr. C. N. Johnson, of Chicago, will write his "Reminiscences of Forty-five Years in Dentistry." These reminiscences will be published in twelve consecutive issues, beginning with the January Journal.

Dr. Johnson is an eminent authority in dentistry. He is an unusually clear thinker, and his articles will be welcomed by the dental profession because he covers in a most thoro manner the field of dental history during its great progress.

It is particularly fortunate that these reminiscences are given to the dental world while Dr. Johnson is still with us. The older man in dentistry will be greatly interested in these articles because of the unusual way in which Dr. Johnson presents biographical sketches of our great men, who have been his personal acquaintances during the last half-century, while the younger man in dentistry will have presented to him a beautiful word-picture of the pioneer in dentistry and its mechanical and scientific progress.

The style and manner in which they are written will so hold the interest of the reader that he will look forward to the next chapter with keen anticipation.

SPECIAL EXCURSION RATES TO THE LOS ANGELES MEETING

War conditions during the last few years have made it impossible to secure satisfactory excursion rates to the annual meetings. Congress, however, has removed the war tax and surtax on railroad and Pullman tickets, to become effective January 1, 1922. The representatives of the passenger associations will meet in Chicago, December 7, and the probabilities are that we will receive special railroad rates to the Los Angeles meeting and return, amounting to about $85.00, with the Pullman rates one way at $23.63. With the transportation rates back to the pre-war basis another element is added toward making the 1922 meeting one of the greatest in the annals of the association.

The National Dental Association under the direction of the Transportation Committee, of which D. C. Bacon is chairman, will run one and possibly two special trains to the Los Angeles meeting. The committee will make an official announcement in the January *Journal.*

REDUCED FARES TO THE CHICAGO DENTAL SOCIETY

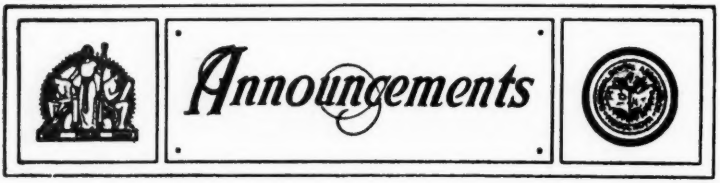
The National Dental Association has secured a special rate of a fare and a half on the certificate plan in the territory of the Western and Central Passenger Association for the Chicago Dental Society meeting, January 19, 20, 21. This reduction will be granted to all members of the National Dental Association and dependent members of their families.

On pages 1042-46 in this issue of the *Journal* will be found a complete program of this meeting.

The annual meeting of the Chicago Dental Society is keenly anticipated by the dental profession in the great Middle West. The session this year promises to excel all previous meetings.

SCANDAL

The man who deals in scandal, who hires others to peddle it, who sanctions it, who writes anonymous letters to circulate it, is a cur. Scandal as a political weapon acts as a boomerang. It is still being used by blackmailing lawyers, crooks and the common everyday thug. The scandal monger always hurls his vile charges and epithets at men of standing. They have no standing or character themselves and therefore judge every man by their own low standards. The law ought to deal more severely with the character thug. Murder means the gallows; character assassination ought to mean the penitentiary. The gossip ought to be put in stocks, and the common, cheap everyday liar in the calaboose.—*Editorial, Morrison's Chicago Magazine.*



CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Institute of Dental Teachers, third week in January, 23, 24, 25, 1922, at Montreal, Quebec. Abraham Hoffman, Secretary, 381 Linwood Avenue, Buffalo, N. Y.

American Society of Dental Radiographers, January 18, 1922, Drake Hotel, Chicago, Ill. Martin Dewey, Secretary, 501 Fifth Ave., New York, N. Y.

STATE SOCIETIES

1922

February

Minnesota, at Minneapolis (22, 23, 24, 25).

March

South Dakota, at Sioux Falls.
Texas, at Houston (13, 14).
Vermont, at Rutland (15, 16, 17).

April

Alabama, at Birmingham (11, 12, 13).
Connecticut, at New Haven (20, 21, 22).
Kentucky, at Louisville (10, 11, 12).
Michigan, at Detroit (10, 11, 12).
Mississippi, at Meridian.
Tri-State—Oklahoma, Kansas and Missouri, at Kansas City, Missouri (10-15).
West Virginia, at Fairmont (10, 11, 12).

May

Arkansas, at Little Rock.
Illinois, at Springfield (9, 10, 11).
Indiana, at Indianapolis (15, 16, 17, 18).
Iowa, at Des Moines (2, 3, 4).
Massachusetts, Worcester (2, 3, 4).
Nebraska, at Lincoln.
New Jersey, at Trenton, (3, 4, 5).
North Dakota, at Fargo.
South Carolina, at Georgetown.

June

California (Southern), at Los Angeles.
Georgia, at Augusta (14, 15, 16).
North Carolina, at Wrightsville Beach.
Utah, at Salt Lake City (19-24).
Wyoming, at Sheridan (20, 21, 22).

July

Washington, at Seattle.
Wisconsin, at Milwaukee (11, 12, 13).

September

Delaware, at Wilmington (14).

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

Delaware, at Wilmington, Municipal Building, Tenth and King Streets, January 11 and 12, 1922. W. S. P. Combs, Secretary, Middletown.

North Carolina, at Raleigh, January 12, 1922. F. L. Hunt, Secretary, Asheville.

North Dakota, at Fargo, January 10, 1922. W. E. Hocking, Secretary, Devils Lake.

South Dakota at Sioux Falls, January 9, 10, 11, 12, 1922. L. R. Ralston, Secretary, Redfield.

Tennessee, at Memphis, May 8, 9, 10, 11, 1922. J. Minor, Secretary, Nashville.

KENTUCKY STATE DENTAL ASSOCIATION

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Kentucky, April 10, 11, 12, 1922. The Seelbach Hotel will be headquarters. A clinical program of unusual interest is being arranged. Address all correspondence to

W. M. RANDALL, *Secretary*,
1035 Second St., Louisville, Ky.

NEW JERSEY STATE DENTAL SOCIETY

The fifty-second annual meeting of the New Jersey State Dental Society will be held May 3, 4, 5, 1922, at the new Stacy-Trent Hotel, Trenton, New Jersey.

For details address Dr. R. S. Hopkins, 913 Broad Street, Newark, New Jersey, chairman of the Exhibit Committee, or

F. K. HEAZELTON, *Secretary*.
223 Hanover St., Trenton, N. J.

DELAWARE STATE BOARD OF DENTAL EXAMINERS

The Delaware State Board of Dental Examiners will hold their next examination in Wilmington, Delaware, Municipal Building, Tenth and King Streets, January 11 and 12, 1922.

For further information apply to

W. S. P. COMBS, *Secretary*,
Middletown, Del.

NORTH DAKOTA STATE BOARD OF DENTAL EXAMINERS

The next meeting of the State Board of Dental Examiners for North Dakota will be held in Fargo, the second Tuesday in January. For application blanks and further particulars write to the Secretary. All applications and credentials must be in the hands of the Secretary by January 1.

W. E. HOCKING, *Secretary*,
Devils Lake, N. D.

ST. LOUIS STUDY CLUB

The St. Louis Study Club announces to the dental profession the inauguration of its 1921-22 free postgraduate instruction.

This unique organization again for the fourth year successfully with a unity of happy co-operation enrols one hundred and forty progressive minded men, awakened to their responsibility as dentists.

Catalogue explaining in detail synopsis of courses and practical study club application will be mailed to any society or individual interested.

MAX FENDLER, *President*,
Central National Bank Bldg., St. Louis, Mo.

NATIONAL DENTAL SORORITY

The National Dental Sorority was organized at Milwaukee, Wisconsin, August 18, 1921 by the following women: Josephine D. Pfeifer, Chicago, Ill.; Celia Rich, Nashville, Tenn.; Katherine Prathers, Chicago, Ill.; Mae Fontaine, Los Angeles, Cal.; Helen Addenbrooke, Milwaukee, Wis.; Kate A. Dohrety, Milwaukee, Wis.; Mary Hastings, Oshkosh, Wis.; Vida A. Lathom, Chicago, Ill.; M. Evangeline Jordon, Los Angeles, Cal.; Anna Burmeister, Milwaukee, Wis.; Minnie Proctor, Los Angeles, Cal. They urge the cooperation of every woman dentist in the United States to make the second meeting, which will be held in Los Angeles during the National Dental Association in 1922, a marked success.

All women who have not joined as individuals or as members of local sororities are urged to communicate with the president, or the secretary.

Plan to come out and help us have a wonderful meeting next year.

M. EVANGELINE JORDON, *President*
1125 Marsh-Strong Bldg., Los Angeles, Cal.
MAE FONTAINE, *Secretary*
406 Consolidated Realty Bldg., Los Angeles, Cal.

AMERICAN INSTITUTE OF DENTAL TEACHERS

The twenty-ninth annual meeting of the American Institute of Dental Teachers will be held at the Windsor Hotel, Montreal, Quebec, on January 23, 24, 25, 1922.

An interesting program has been arranged built around the theme of preventive dentistry and its correlated subjects: what, when, how and why to teach. There will also be a complete exhibit of scientific teaching apparatus, college equipment, etc.

All interested in dental teaching are cordially invited to attend.

GUY S. MILLBERRY, *President*
ABRAM HOFFMAN, *Secretary-Treasurer*
381 Linwood Ave., Buffalo, N. Y.

AUTOMOBILE TRIP FROM SAN FRANCISCO TO LOS ANGELES FOR MEMBERS OF THE NATIONAL DENTAL ASSOCIATION

The dentists of northern California are making plans whereby dentists and their families will be their guests on an automobile trip from San Francisco to Los Angeles, the meeting place of the National Dental Association, July 17-21, 1922. Will all dentists who are planning to accept this kind invitation, which is but another proof of the genial hospitality of the West, kindly send their names to John D. Millikin, Elkan-Gunst Building, San Francisco, before March 1, so that proper transportation arrangements may be made. Requests will be placed in the order of their receipt. For further information address

JOHN D. MILLIKIN
Elkan-Gunst Bldg., San Francisco, Cal.

TRANSPORTATION TO THE CHICAGO DENTAL SOCIETY CLINIC

The Transportation Committee reports that applications for reduced fares to the January meeting of the Chicago Dental Society have been made and there is little doubt that these will be granted.

For further information address

D. C. BACON, *Chairman*,
31 N. State St., Chicago, Ill.

FIFTY-EIGHTH ANNUAL MEETING AND CLINIC CHICAGO DENTAL SOCIETY

DRAKE HOTEL
JANUARY 19, 20 AND 21, 1922

FULL-DAY SECTIONS

THURSDAY

FORENOON

Section No. 1.—Technic of Using a Special Denture Impression Wax for Impressions of Edentulous Mouths.
Method of Refitting Vulcanite Dentures and Technic of Rebasing Dentures.

AFTERNOON

Illustrated Lecture

Partial Denture Construction. Clasp and Attachments. G. Walter Dittmar.

Section No. 2.—A Standardized Partial Denture Technic. F. E. Roach.

(1) By means of illustrated talks and demonstrations we will endeavor to show a standardized technic for making better partial denture castings.

(2) During the past year we have made a rather extensive study of investments and the tempering of castings. Some very interesting and rather startling things have developed as a result of these investigations. Our findings will be given.

Section No. 3.—Full Denture Construction.
Under direction of Rupert E. Hall.

Section No. 4.—Porcelain Jacket Crown.

George Thompson
Milo G. Krall
George H. Maxwell
Joseph B. Lyding
John D. Lyding

Each step will be shown in detail:

1. Variations in types of preparation.
2. Model construction.
3. Methods of forming the matrix.
4. Reproduction of shade.
5. Practical demonstration showing the use and results of high fusing stain for artistic results.

Section No. 5.—Histology and Pathology of the Dental Tissues.

The following men will be prepared with lantern slides, microscopic slides, and other material to conduct a discussion of the following topics:

10:00 A. M.—12 M.—Protective Formation of Cementum.
Newton G. Thomas

2:00 P. M.—3:00 P. M.—Pulp Degeneration as Related to Pyorrhea.
Edward H. Hatton

3:00 P. M.—4:00 P. M.—Dental Tissues as Related to Pulpless Teeth.
William G. Skillen

4:00 P. M.—5:00 P. M.—Is a Pulpless Tooth Dead?
Frederick B. Noyes

Section No. 6.—Crown and Fixed Bridge-Work from the Modern Viewpoint.
Robert E. MacBoyle

SYNOPSIS.—An analysis of present-day "fixed bridge" requirements. Knowledge of conditions relative to fixed bridge. Work before and since the advent of the X-ray. Conditions of today with which dentists are confronted. Two important eras in the time of fixed bridge-work. New "abutment pieces" for vital teeth, both anterior and posterior. Technic of constructing same. Illustrated by means of slides and blackboard.

Section No. 7.—The G. V. Black Dental Unit of Chicago, Northwestern University. Gold Inlays. Charles W. Freeman, *President.*

K. E. Bignell	C. M. Holland	F. W. Merrifield
R. E. Blackwell	R. E. Huntington	H. F. Methven
M. J. Buckley	H. S. Ingram	J. L. Morlan
J. F. Christiansen	G. R. Lundquist	I. A. Smothers
H. G. Fisher	Eugene Maginnis	H. I. VanTuyle

A definite standardized gold inlay technic will be presented and illustrated step by step on large models. The results of some investigations of waxes and their proper dissipation will be shown and discussed. The technic presented will include only those procedures which are simple as well as accurate, and which have given uniformly good results.

HALF-DAY SECTIONS

THURSDAY

10:00 A. M. to 12:00 M.

Section No. 8.—The Elimination of Pus Pockets—Lecture and Clinic.
Arthur D. Black
F. W. Merrifield

This presentation will consist of a "chalk-talk" by Dr. Black of the diseases of the gingivae and peridental membranes, the pathological changes which take place in the tissues, and the principles which should govern all methods of treatment.

Dr. Merrifield will operate on a number of cases, and both Dr. Black and Dr. Merrifield will show cases which were operated upon from one to several years ago, and which have had no treatment since other than by the patients.

Section No. 9.—Root-Canal Operations.
Fred W. Gethro
J. F. Christiansen

The subject will be treated in a thoroly practical way, eliminating all that is without value, and only using the methods and materials of known scientific value. X-ray films showing cases from the beginning to the completion of treatment will be shown. A definite technic will be minutely described and illustrated with lantern slides. Probably 75 per cent of the time spent in the treatment of teeth is wasted effort and the technic described will eliminate the great waste.

Section No. 10.—A Unit Clinic Demonstrating the Use of Modeling Compound as an Impression Material.
J. H. Hospers, *Chairman.*

2:00 P. M. to 4:00 P. M.

Section 11.—Root-Canal Operations. J. Roy Blayney

The technic of cleaning, enlarging, and filling root canals will be demonstrated by means of lantern slides, charts, decalcified specimens, and dissected skull. The results of various clinical procedures will be shown by lantern slides of practical cases that have been followed over a period of from one to three years. The method of treatment employed in the different cases will be discussed in detail, and an explanation offered as to some of the factors which cause destruction of the periapical tissue following the removal of a vital pulp.

Section No. 12.—Restoring Facial Length and Contour for the Edentulous Patient by Scientifically Constructed Dentures.

A Group Clinic Covering Complete Procedure and Showing Six Patients

by

Members of the Faculty of the Northwestern University Dental School

Under the direction of R. O. Schlosser

In the absence of records other than such as may be obtained from the remaining structures of the masticatory mechanism, also the correction by this means of disturbed relations, brought about by improperly constructed dentures, resulting at times in serious facial disfigurement.

ANNUAL BANQUET IN HONOR OF DR. JOHN P. BUCKLEY, PRESIDENT-ELECT, NATIONAL DENTAL ASSOCIATION

HOTEL DRAKE, THURSDAY EVENING, JANUARY 19, 1922

Reception from six-thirty to seven o'clock—Ladies Invited

Section No. 13.—Oral Surgery and Anesthetics.

10:00 A. M.—Herbert A. Potts—Cook County Hospital, W. Harrison and S. Wood Streets.

10:00 A. M.—Louis Schultz—University of Illinois College of Dentistry, 1838 W. Harrison St.

2:00 P. M.—P. G. Puterbaugh—Chicago College of Dental Surgery, 1747 W. Harrison St.

Section No. 14.—Extraction and Anesthesia Clinic.

10:00 A. M.—Charles W. Freeman, G. R. Lundquist, S. W. Clark—Northwestern University Dental School, 31 W. Lake St.

2:00 P. M.—A. B. Morris, D. M. Hodgman—Chicago College of Dental Surgery, 1747 W. Harrison St.

2:00 P. M.—Frank J. Bernard, C. W. Stewart, L. F. Hein—University of Illinois College of Dentistry, 1838 W. Harrison St., second floor.

NOTICE.—The subject of local anesthesia will be dealt with exclusively in the oral surgery and extraction clinics, where clinicians will show the technic as well as the results on patients. Since there will be no other demonstration of this subject, you should arrange to attend one or more of these clinics.

12:00 M. to 2:00 P. M. and 4:00 P. M. to 5:30 P. M.

MANUFACTURER'S EXHIBITS

FRIDAY

9:00 A. M.—Motion pictures showing the work done in caring for the children's teeth by the Department of Health, Commonwealth of Pennsylvania.

C. J. Hollister, Harrisburg, Pa.

9:30 A. M.—Teaching nutrition to children showing how the diet of children may be improved, and how under proper diet and rest, their weight will increase.

Miss Lydia J. Roberts,

Department of Home Economics, University of Chicago.

10:00 A. M.—Mouth Hygiene for Children. Demonstration of methods of handling children. There will be a group of children of different ages on the stage, to whom instruction will be given.

C. C. Smith, Peoria, Ill.

11:00 A. M.—Paper on "Prophylaxis for Children and Adults."
F. A. Bricker, Rochester, Minn.

11:30 A. M.—Discussion of the morning program on preventive dentistry.
Arthur D. Black.

12:00 M to 2:00 P. M.—Manufacturers' Exhibits.

2:00 P. M. to 4:30 P. M.—Denture Construction.
Charles Lane, Detroit, Mich.

2:00 P. M. to 4:30 P. M.—Showing the various types of casting including inlays, saddles, and full dentures.
K. W. Knapp, Kansas City, Mo.

2:00 P. M. to 4:30 P. M.—Technic for gold inlays, also certain special points in the technic of gold foil and amalgam fillings as worked out by the California G. V. Black Club. The presentation will consist of practical points intended to be of service in the improvement of the finer details of technic.
Guy S. Millberry, San Francisco, Cal.

2:00 P. M. to 4:30 P. M.—Prophylaxis. Practical talk and demonstration on the reasons of each particular phase of brushing. Correcting abnormal surface wear and talk on the results of traumatic occlusion.
F. A. Bricker, Rochester, Minn.

2:00 P. M. to 4:30 P. M.—Fixed bridge.
J. D. White, St. Louis, Mo.

FRIDAY

Special Oral Surgery and Extracting Clinics at the Various Hospitals and Colleges

9:30 A. M.—F. B. Moorehead, University of Illinois College of Dentistry, 1838 W. Harrison St.

10:00 A. M.—Thomas L. Gilmer—Northwestern University Dental School, 31 W. Lake St.

2:00 P. M.—William H. G. Logan—Cook County Hospital, W. Harrison and Wood Sts.

Extracting and Anesthetics

10:00 A. M.—Charles W. Freeman, S. W. Clark, G. R. Lundquist—Northwestern University Dental School, 31 W. Lake St.

2:00 P. M.—Frank J. Bernard, C. W. Stewart, L. F. Hein—University of Illinois College of Dentistry, 1838 W. Harrison St.

2:00 P. M.—A. B. Morris, D. M. Hodgman—Chicago College of Dentistry, 1747 W. Harrison St.

NOTICE.—In the above mentioned clinics due prominence will be given to the subject of local anesthesia, in demonstrating on patients the various types now in use, giving technic, indications, and contra-indications, etc.

FRIDAY EVENING

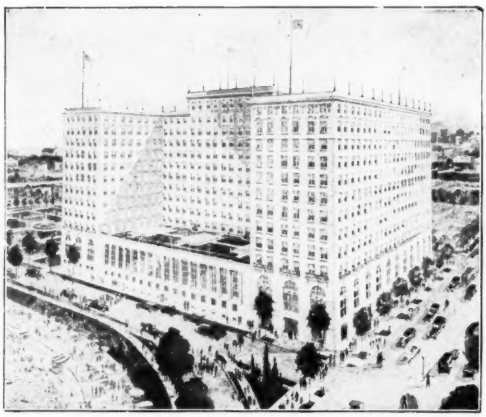
7:45 P. M.—Moving pictures, C. J. Hollister.

8:15 P. M.—Studies of Diet in Relation to Health, E. V. McCullum.

SATURDAY

9:30 A. M.—The general clinics will demonstrate a wide range of subjects. From eighty to one hundred clinicians from the Chicago Dental Society and from other societies will present chair and table clinics of interest.

THE DRAKE



Make your reservations for hotel accommodations early as a large registration is anticipated. The rates at the Drake for single rooms with bath are $4, $5, $6, $7, and $8, per day; small double rooms containing one double bed and bath, $6 and $7 per day and large double rooms containing two beds and bath, $8, $10, $12 and $14 per day. The double rooms are the same rate when occupied by one or two persons. In the Italian restaurant will be served a table d'hote luncheon at 75 cents and dinner at $1.50.

GRITTING TEETH HABIT—ANY REMEDY?

I have two patients who while asleep grit their teeth so hard that it sounds like the cracking of nuts, thereby causing much annoyance to their roommates. I would like to receive suggestions from someone in the profession who may have had a similar case—the method used to correct same and the result.

CARL GLASER,
902 Arcade Bldg., St. Louis, Mo.

THE AMERICAN SOCIETY OF DENTAL RADIOGRAPHERS

The American Society of Dental Radiographers will meet at the Drake Hotel, Chicago, Illinois, on January 18, 1922. A scientific program of unusual interest has been prepared, besides the transaction of important business matters. All interested in dental radiography are invited to attend.

H. C. MCKITTRICK, *President*,
I. O. O. F. Bldg., Indianapolis, Ind.
MARTIN DEWEY, *Secretary-Treasurer*,
501 Fifth Ave., New York, N. Y.

ALPHA OMEGA DENTAL FRATERNITY

The Alpha Omega Dental Fraternity will hold its fourteenth annual convention at the Hotel Astor, New York City, on December 28, 29, and 30, 1921.

For further information, address the supreme scribe, S. H. Bomenblit, 2456 N. 16th St., Philadelphia, Pa.

MARQUETTE UNIVERSITY DENTAL ALUMNI ASSOCIATION

The fifteenth annual meeting of the Marquette University Dental Alumni Association will be held at the Auditorium, Milwaukee, Wisconsin, February 15, 16 and 17 1922. W. H. REUTER, *Secretary,*
1076 Teutonia Ave., Milwaukee, Wis.

DENTAL CORPS ORDERS FROM WAR DEPARTMENT.

NAVY

Lieutenant Justine W. Bourquin, receiving ship, San Francisco; revocation appointment.

Lieutenant E. C. O'Connell, to Melville.

Lieutenant E. J. Noonan, naval training station, Hampton Roads, Va.; to marine force, Port-au-Prince, Haiti.—*Army and Navy Register,* October 29, 1921.

Lieutenant Commander J. D. Halleck, navy yard, Puget Sound; to Idaho.

Lieutenant D. L. Chamberlain, naval hospital, Puget Sound, Wash.; to Buffalo.

Lieutenant A. H. Yando, Buffalo; to naval training station, San Francisco.

Lieutenant (J. G.) W. D. Day, marine barracks, Quantico, Va.; to Delaware.

Lieutenant Walter Rehrauer, Delaware; to marine baracks, Quantico, Va.

Lieutenant C. E. Delmer, naval training station, Hampton Roads, Va.; revocation appointment.—*Army and Navy Register,* November 5, 1921.

Lieutenant Carl Reynolds, naval training station, Great Lakes, Ill.; to marine detachment, American Legation, Manague, Nicaragua.

Lieutenant E. G. Hoylman, marine detachment, American Legation, Managua, Nicaragua; to R. B., Hampton Roads, Va.

Lieutenant Commander G. G. Frazier, resignation accepted.

Lieutenant G. E. Nicholas, naval training station, Newport, R. I.; to R. S., Boston, Mass.

Lieutenant (J. G.) R. R. Crees, to continue duty on board Melville.—*Army and Navy Register,* November 12, 1921.

Lieutenant Hyman Mann, Minnesota; to marine barracks, navy yard, Philadelphia, Pa.

Lieutenant E. C. O'Connell, Buffalo; to squadron 10.

Lieutenant A. C. Tollinger, marine barracks, navy yard, Philadelphia, Pa.; to connection with fitting out Argonne and on board when commissioned.

Lieutenant H. B. Duncan, Idaho; to navy yard, New York, orders to navy yard, Puget Sound, revoked.

Lieutenant A. H. Hetler, Leonidas; to connection with fitting out Denebola and on board when commissioned.—*Army and Navy Register,* November 19, 1921.

Lieutenant L. C. Frost, marine barracks, Quantico, Va.; to 16th naval district.

Lieutenant C. E. Kelly, naval training station, Hampton Roads, Va.; to naval station, Guam.

Lieutenant C. R. Wells, naval station, Guam; to R. S. San Francisco.

Lieutenant (J. G.) L. M. Desmond, navy yard New York; to Camden.

Lieutenant A. L. Burleigh, Frederick; to Melville.

Lieutenant R. P. Morse, naval training station, Newport; to marine baracks, Hampton Roads, Va.

Lieutenant (J. G.) R. R. Crees, Melville; resignation accepted.

Lieutenant H. G. Ralph, Kansas; to Chaumont and on board when commissioned.

James L. Brown has been promoted to be a dental surgeon.—*Army and Navy Register,* November 26, 1921.

ARMY

Captain Oliver J. Christiansen from duty with 80th Field Artillery and from temporary duty at station hospital, Camp Meade, Md., and will report at Camp Meade for duty.—*Army and Navy Register,* October 29, 1921.

Lieutenant Colonel John A. McAliser, Jr., from duty as assistant to surgeon 5th corps area, Fort Benjamin Harrison, Ind., and detailed as professor of military science and tactics at Creighton University Dental School, Omaha, Neb.

Major Bruce H. Roberts, upon arrival in United States, report to commanding general 2d corps area for assignment to duty and station.—*Army and Navy Register,* November, 5, 1921.

Lieutenant Colonel John R. Ames from duties in Philippine Department, effective upon completion of present tour of foreign service, to duty at Letterman General Hospital, San Francisco.

Major John L. Schock, Captain Claude R. Hollister from duties in Philippine Department, effective upon completion of present tour of foreign service, and upon arrival in United States will report by telegraph to commanding general, 8th corps area for assignment to duty and station.

Major George R. Tressel, Captains Milton J. Damlos, Alvin D. Dannheisser, Melvin R. Eiche, Milton A. Price, William S. Shuttleworth to San Francisco and about January 5 to Philippine Department for duty.

Captains Edward C. Alley, Nathan C. Pickles, First Lieutenant Forest V. Bockey from duty in Philippine Department, effective upon completion of present tours of foreign service, to San Francisco and report to commanding general 9th corps area for assignment.

Captain Joseph H. Jaffer report to retiring board at Washington for examination.—*Army and Navy Register,* November 19, 1921.

Captain Daniel S. Lockwood from duty at Camp Grant, Ill., and report by letter to commanding general 6th corps area for assignment to duty and station.

The following promotion in the Dental Corps of the Regular Army is announced: Vivian Z. Brown, from November 1.—*Army and Navy Register,* November 26, 1921.

The following applicants have accepted appointments in the Dental Reserve Corps: First Lieutenant Raymond S. Stevens, Plainfield, N. J.; Captain L. H. Renfrow, St. Louis, Mo.; Captain B. M. Russell, Kansas City, Mo.; First Lieutenant E. H. Wyman, Aiken, S. C.; First Lieutenant W. P. Ford, Dorchester, Mass.

NEW BOOKS RECEIVED FOR THE LIBRARY OF THE JOURNAL OF THE NATIONAL DENTAL ASSOCIATION

The Journal of the National Dental Association promptly acknowledges here the receipt of new publications. Books selected from those named on this list are reviewed below. Reviews are matter-of-fact statements of the nature and contents of the publications referred to and are intended *solely to guide possible purchasers.*

Electro-Radiographic Diagnosis. Howard Riley Raper, D.D.S., St. Louis; C. V. Mosby Co., 1921. 160 pages; 135 illustrations, $3.50.

The Key to Good Teeth. Robert Nowack, D.D.S., Menominee, Mich. The Herald Leader Co., 1921. 19 illustrations.

A Practical Treatise on the Technics and Principles of Dental Orthopedia and Prosthetic Correction of Cleft Palate. Calvin S. Case, M.D., D.D.S., Professor of Prosthetic Dentistry and Orthodontia, Chicago College of Dental Surgery. $10.00.

Among the many textbooks of medicine and dentistry published within the past year, we are pleased to give favorable mention to the second edition of *Dental Orthopedia and Prosthetic Correction of Cleft Palate,* by Calvin S. Case, Chicago, Ill., and printed by R. R. Donnelley & Sons Co., of Chicago.

The orthodontia teaching of this work has been rewritten and rearranged thruout, and much of that which appeared in the first edition has been eliminated, but more than replaced by new matter of modern scientific and mechanical quality.

The five chapters on "Etiologic Principles of Malocclusion with Reference to Treatment," present those broad and scientific principles of orthodontia which should be read with the greatest interest and instruction by the general practitioner of dentistry as well as the orthodontist. This, together with "Principles of Mechanics in the Movement of Teeth," in Part IV, and the somewhat lengthy chapter XXI upon "Orthodontic Principles of Diagnosis and General Rules of Treatment in Classified Malocclusions," embodies, in our estimation, the most advanced underlying principles of all systems of orthodontia of whatever school.

Dr. Case makes no attack or detracting allusion to other methods of treatment which he does not advocate or teach. In fact, he tells us that one of the needs of rewriting the entire work was to place his teaching under the more popular dento-occlusal classification, which was first introduced by Dr. Angle, but which the author has considerably increased with a larger number of divisions and types, to fulfil the demands of advanced understanding in special characters of dento-facial malocclusions.

One of the principal features of this work is the long looked for treatise in Part IX, entitled "The Prosthetic Correction of Cleft Palate," which not only goes into the most detailed teaching of the technic construction of the modern velum obturator, with its wonderful possibilities in imitating the normal activities of the velum palati in its function of speech, but he gives us a complete understanding of the mechanism of speech and how to teach cleft palate patients to speak perfectly after competent operations.

From an artistic standpoint, also, this work is unsurpassed, if equaled, by any textbook of medicine or dentistry, in its binding, paper, print, and half-tone illustrations.

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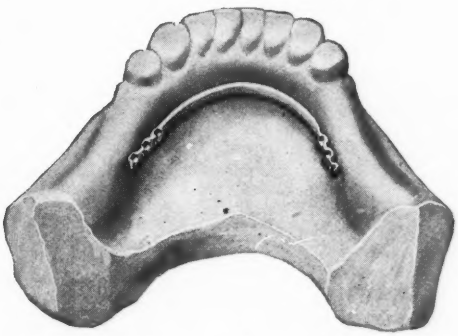

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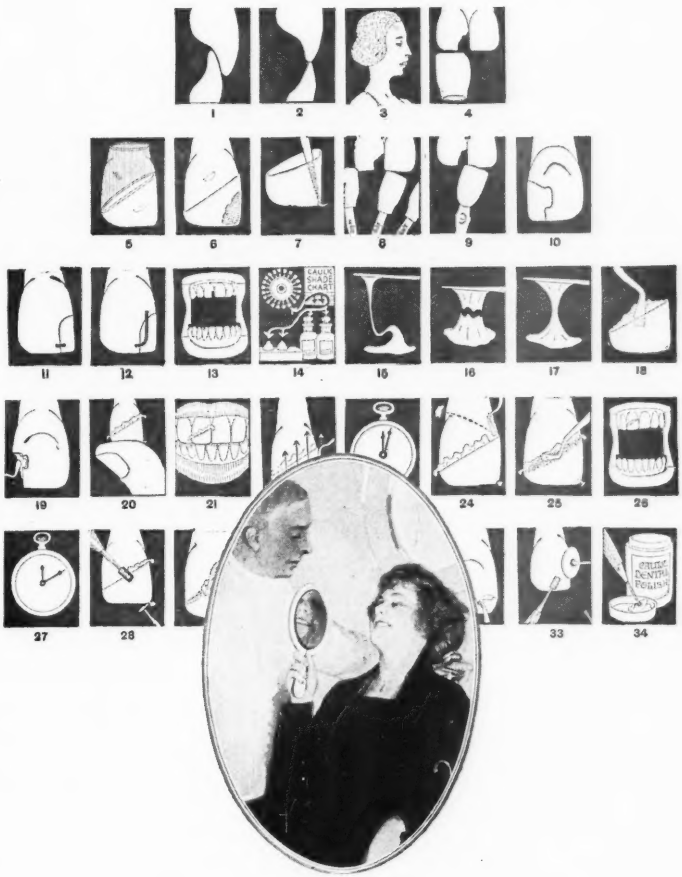

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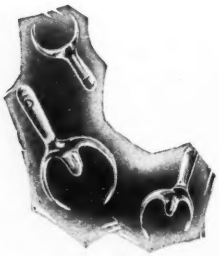

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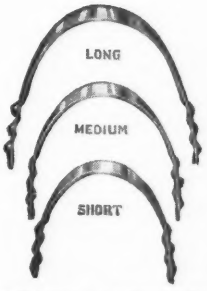

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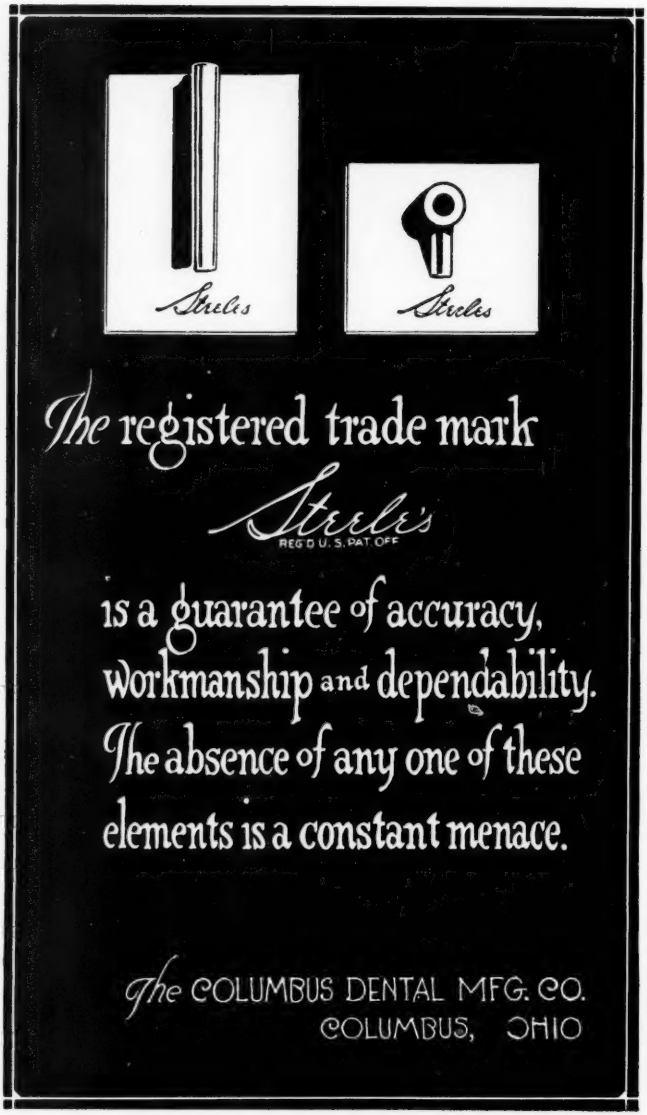
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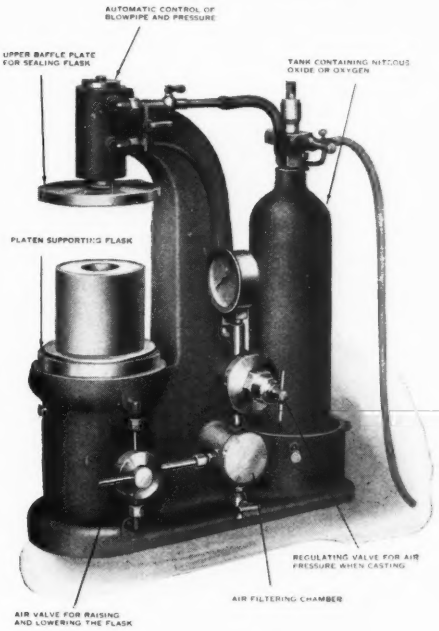
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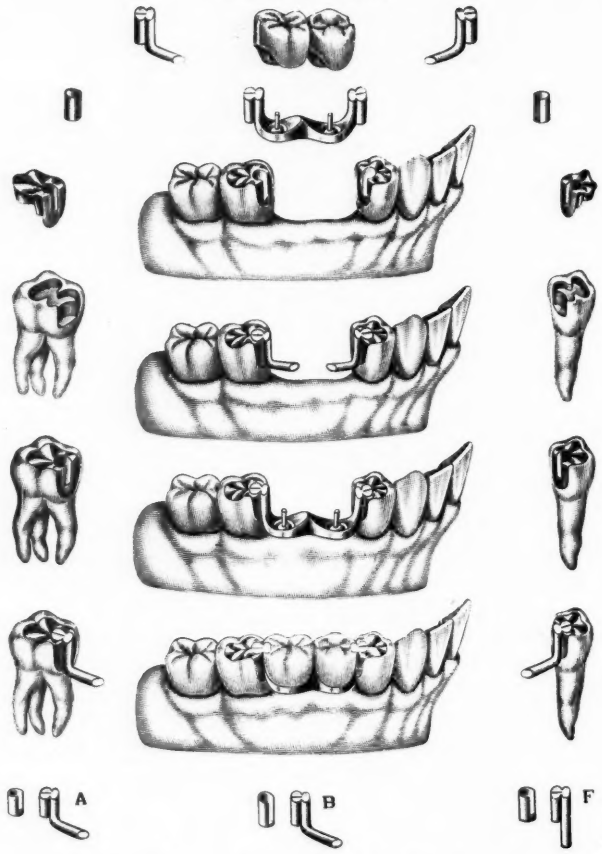

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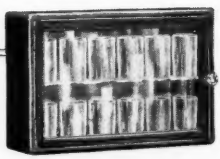

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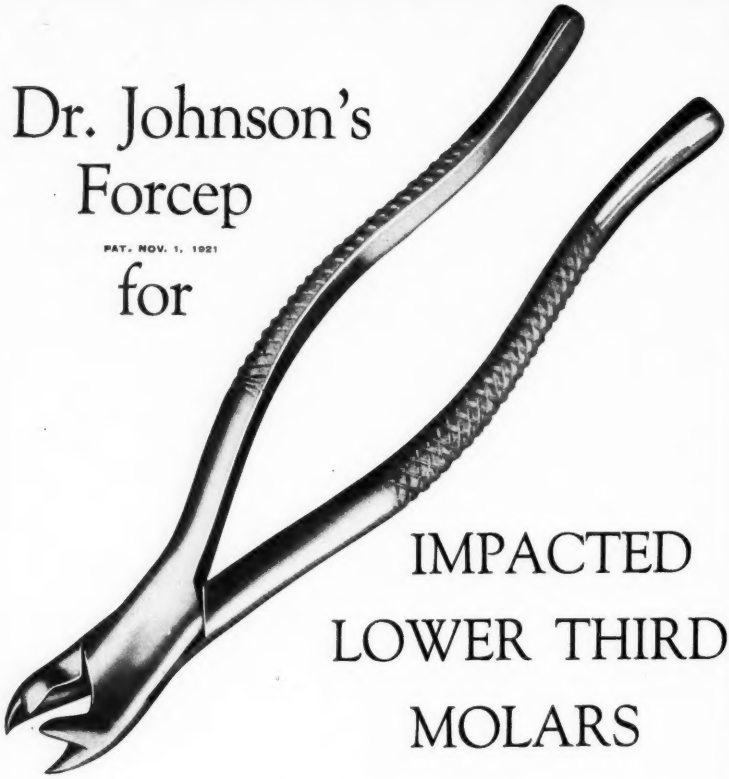

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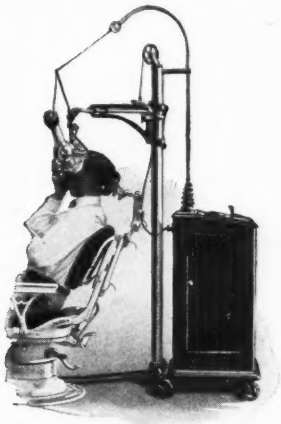

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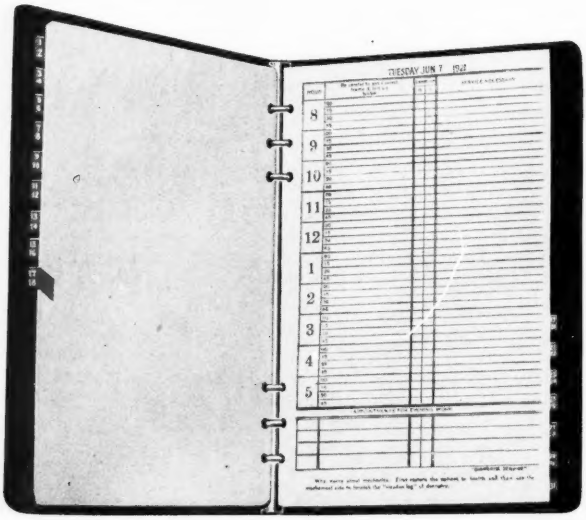

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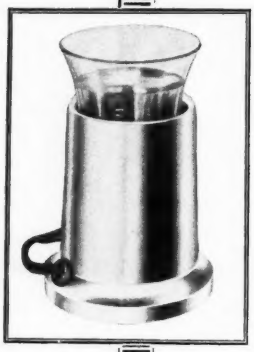

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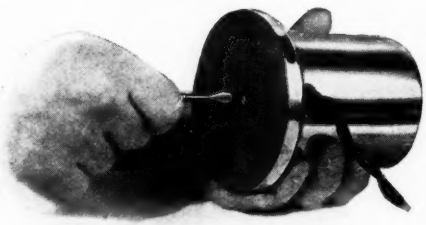

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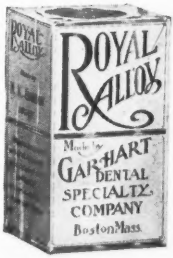

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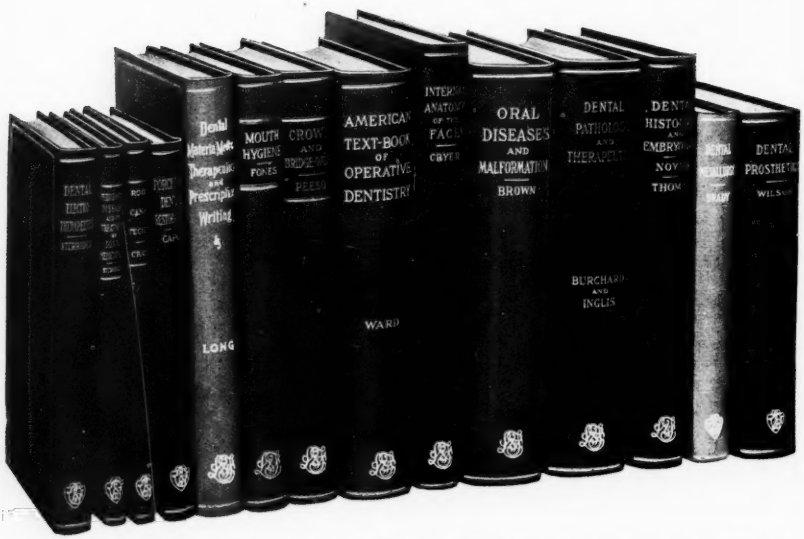

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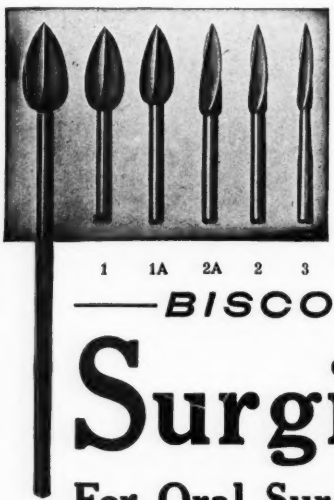

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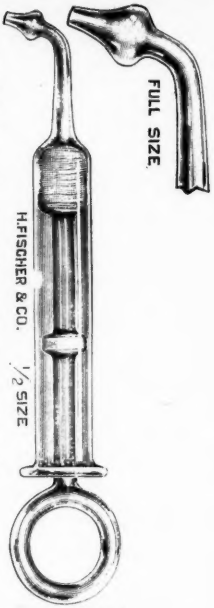

Fig. 360
Guillotine Forcep

Fig. 810
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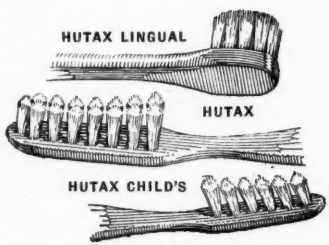

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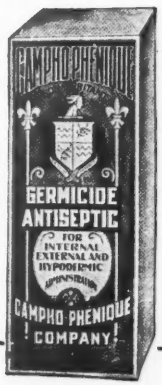

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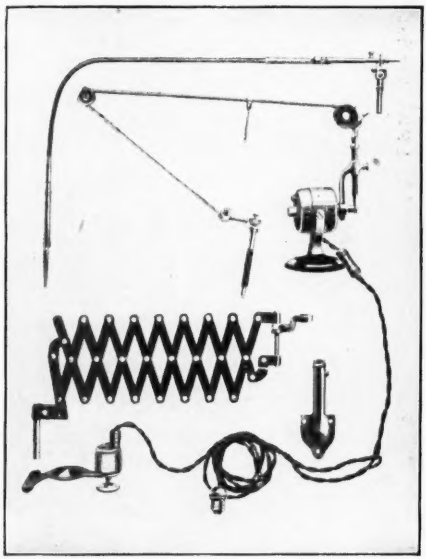

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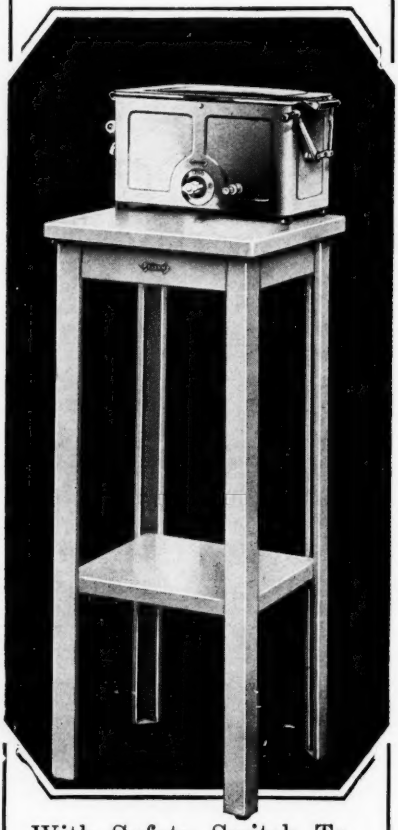

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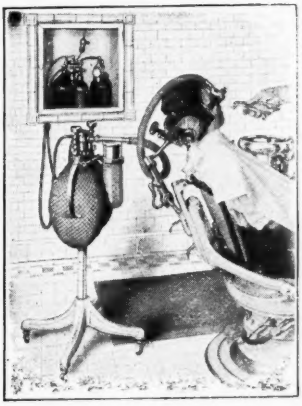

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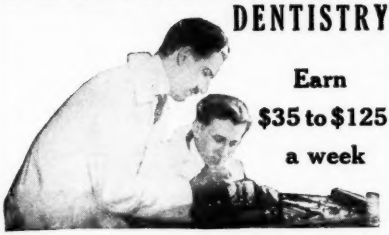

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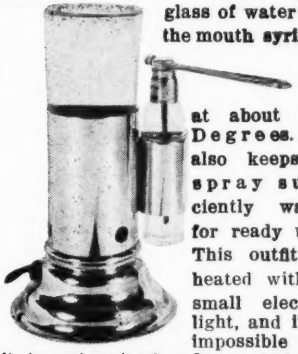

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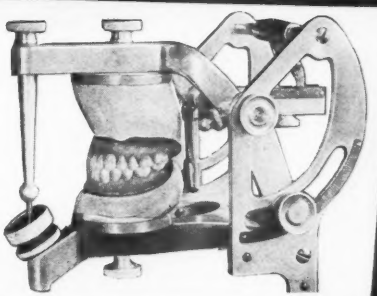

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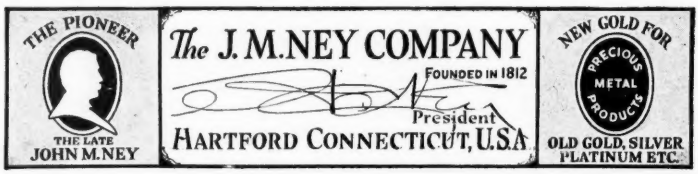

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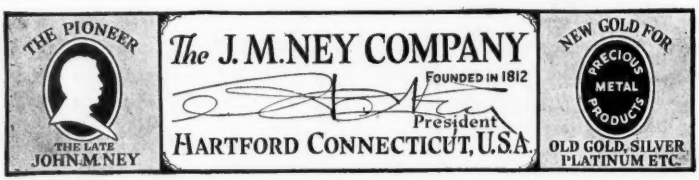
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